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A TREATISE

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DISEASES OF THE TONGUE.



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Fissured tongue (Syphilitic)

No. 25.

A TREATISE
ON THE
DISEASES OF THE TONGUE.

BY

W. FAIRLIE CLARKE,

M.A. AND M.B. (OXON.), F.R.C.S.

ASSISTANT SURGEON TO CHARING CROSS HOSPITAL.

"It must surely be considered an admirable thing to find so many faculties seated in the tongue, each with its appropriate organization, and each most curiously connected with other structures; that we should have the power of mastication, deglutition, of modulation of the voice, the senses of taste and of touch, concentrated in an apparently simple organ."

SIR CHARLES BELL'S *Dissertations on Paley's Natural Theology*.

HENRY RENSHAW,
356, STRAND, LONDON.

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SIR JAMES PAGET, BART.,

D.C.L., V.P.R.S.,

SERGEANT SURGEON EXTRAORDINARY TO H.M. THE QUEEN;

SURGEON TO H.R.H. THE PRINCE OF WALES, ETC. &C.

This Work is Dedicated,

By Permission,

IN ADMIRATION OF HIS CHARACTER AS A MAN, AND OF HIS
ABILITY AND SKILL AS A SURGEON.

P R E F A C E.

THERE is perhaps no part of the human body, not essential to life, which is of more importance than the tongue. Placed as it is at the entrance to the alimentary tract, aiding in mastication and deglutition, endowed with the special sense of taste, and taking a large share in those modulations of the voice which constitute articulate speech, it is an organ which cannot be injured or diseased without laying the patient under the most serious disabilities.

But, besides this, it is an organ which has been examined from the earliest times as affording an index to the state of the general health; and medical men have been in the habit of inspecting it with the same regularity that they have felt the pulse.

Yet, notwithstanding the importance of the tongue in the human economy, it has not received that amount of minute study which it deserves. Its diseases have not formed the subject of any special treatise in this, or—as far as I have been able to ascertain—in any other country; and the works which have dealt with its semeiology have furnished us with nothing but the most general conclusions.

The sense of taste, and the part which the tongue takes in the formation of speech, are briefly discussed in the following pages. But these are questions which belong to

physiology rather than to surgery, and anything like a full consideration of them would be out of place in a practical treatise of this kind.

In the present work I have scarcely done more than allude to the functional changes that manifest themselves on the surface of the tongue. I have confined myself strictly to its diseases and injuries. These are all of a surgical nature, and to these I have for some time past directed my special attention. I have kept a record of all cases of tongue disease that have come before me, and in many instances I have made drawings of the morbid appearances presented by the organ.

The lithographs which are interspersed with the following pages have been made by Mr. Burgess, the well-known pathological draughtsman, from cases which have been under my own care. For the woodcuts, which have been taken from my own sketches, I must bespeak the indulgence of the reader.

W. F. C.

12, MANSFIELD STREET, CAVENDISH SQUARE, W.

March, 1873.

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A TREATISE

ON THE

DISEASES OF THE TONGUE.

CHAPTER I.

THE ANATOMY AND PHYSIOLOGY OF THE TONGUE.

It is not my intention to attempt to give a full and complete account of the anatomy and physiology of the tongue. All that I shall aim at in this chapter is to remind the reader of those points which have the most direct bearing upon its diseases, and which are of the greatest practical importance.

The tongue is a double organ, consisting of two symmetrical halves placed side by side; and each half is supplied with corresponding muscles, blood-vessels, and nerves. It is essentially muscular. The functions which it has to discharge require frequent and varied changes of form and position. It is, therefore, furnished with muscular fibres, which are arranged in such a way as to give it the power of moving in every direction.

It is placed at the upper extremity of the alimentary canal, and its primary uses are those of an organ of touch, taste, and mastication. It has, however, another function to perform; for it plays an important

part in articulate speech, and by its aid certain modifications of the voice are produced. These various offices it is enabled to fulfil in consequence of the number and delicacy of its nervous connections. However simple it may appear to the ordinary observer, the anatomist knows that it has a wonderful complexity. He discovers that there are in it sensory nerve-fibres which convey to the cerebrum impressions, whether of common sensation or of taste; that there are other fibres which transmit the mandates of the brain; that there are others, again, which associate it with the gullet in the act of swallowing; and, lastly, others which harmonize its movements with those of the larynx in the production of speech.

The tongue derives its base of support chiefly from two points—the inner surface of the lower maxilla and the hyoid bone. These support it near the middle line, and laterally it is attached, either directly or indirectly, to the gums, the soft palate, and the superior constrictor muscle of the pharynx. Anteriorly it is restrained by the *frænum linguæ*. Posteriorly it is connected with the epiglottis by three folds of mucous membrane—the glosso-epiglottidean ligament. From the nature of these attachments it is capable of considerable movement in accordance with the motions of the pharynx in deglutition; while it has sufficient fixity to admit of its moving upon itself, in almost every direction, in mastication and speech.

The muscles of the tongue are commonly divided into *extrinsic*, *intrinsic*, and *accessory*.

The extrinsic muscles are the palato-glossus, the styloglossus, the hyo-glossus, and the genio-hyo-glossus.

The intrinsic muscular fibres are disposed in an intricate manner, but their general arrangement is such that they have either a longitudinal, a vertical, or a transverse direction.

The accessory muscles are those which act upon the hyoid bone, without having any direct connection with the tongue.

Let me now speak a little more at length of each of these groups of muscles.

Extrinsic Muscles.—The palato-glossus (Fig. 1, *c*) forms the anterior pillar of the fauces. It arises from the soft palate on the outside of the uvula, in close association with the palato-pharyngeus, passes downwards and outwards, and is inserted into the sides of the tongue, where its fibres spread out and blend with those of the stylo-glossus. The action of this muscle is to depress the soft palate and to draw the base of the tongue upwards and backwards in the act of deglutition, so as to serve as a *constrictor isthmi faucium*.

The stylo-glossus (Fig. 1, *d*) is a slender muscle which passes from the styloid process and the stylo-maxillary ligament downwards and inwards, and is spread out upon the side of the tongue. Some of its fibres may be traced nearly to the tip, blending with those of the hyo-glossus, which have the same direction, and also with the intrinsic muscles of the tongue. When both muscles act, they draw the base of the organ upwards and backwards, spread it out, and make it concave from side to side. When only one acts, it turns the tongue to that side.

The hyo-glossus (Fig. 1, *e*) is a thin flat plane of

muscular tissue, which arises from the greater cornu of the hyoid bone, and from the adjacent portion of its body. From this double origin it ascends almost vertically in two distinct slips, which are separated by a cellular interval. That portion which arises from the cornu of the hyoid bone is inserted into the side of the tongue, while

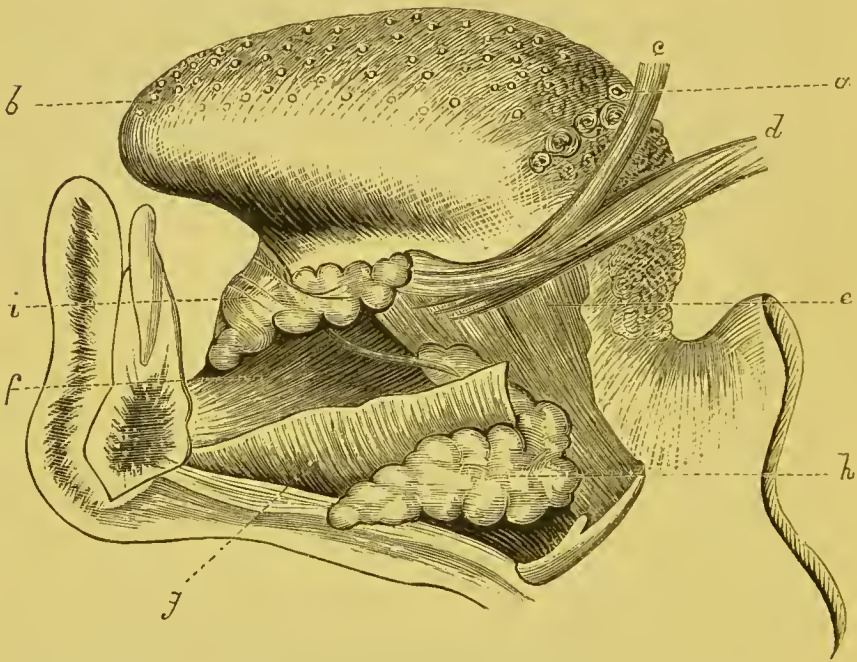


FIG. 1.—*a*, circumvallate papillæ; *b*, fungiform papillæ; *c*, palatoglossus muscle; *d*, stylo-glossus muscle; *e*, hyo-glossus muscle; *f*, genio-hyo-glossus muscle; *g*, mylo-hyoid muscle; *h*, submaxillary gland; *i*, sublingual gland.

that which springs from the body of the bone curves forward along the border of the organ, unites with the fibres of the stylo-glossus, and blends with the intrinsic muscles. When both muscles act, they retract and draw down the sides of the tongue, so as to render it convex from side to side.

The genio-hyo-glossus (Fig. 1, *f*) is a thin flat muscle of a triangular form, which arises from the margin of the symphysis of the lower jaw, in close association with its fellow of the opposite side, and is spread out like a fan—its upper fibres going to the tongue, while its lower ones are inserted into the hyoid bone. By its upper fibres it draws the tongue directly forwards, while its lower fibres contribute to the same result by raising the hyoid bone.

The *intrinsic* muscular fibres of the tongue are mostly arranged in three directions — longitudinal, vertical, and transverse (Fig. 2). The longitudinal are found chiefly near the surface, and may be considered as being disposed in an inferior, a superior, and two lateral bundles. The



FIG. 2.—Intrinsic muscular fibres. $\times 60$.

vertical fibres are most abundant near the median line, and the transverse near the horizontal median plane. These latter are altogether intrinsic, arising from the dense submucous layer of areolar tissue on one side of the organ, and being inserted into the corresponding structure on the other side. Fig. 2 is a vertical section of the muscular substance near the upper surface, and shows the way in which the bundles of fibres are inserted. Between the bundles are seen groups of longitudinal fibres cut transversely.

Of the longitudinal and vertical fibres some are wholly intrinsic, while others are derived from extrinsic muscles. Thus many of the lateral longitudinal fibres are continuous with the stylo-glossi muscles, while many of the vertical fibres proceed from the genio-hyo-glossi. The longitudinal and transverse fibres cross and interlace, like a piece of matting, leaving small interspaces, through which the vertical fibres pass. It is a peculiarity of the muscular fibres of the tongue that, like those of the heart, they sometimes branch in a remarkable manner.

The *accessory* muscles of the tongue need only to be indicated. They are those which act upon it indirectly, either by co-operating with the extrinsic muscles or by steadying the hyoid bone, and thus giving to the tongue a fixed base, from which it can act more powerfully. As examples of the first method, we may notice how the stylo-hyoid and posterior belly of the digastric unite with the stylo-glossus in drawing the tongue upwards and backwards. In a similar way the anterior belly of the digastric, the mylo-hyoid (Fig. 1, *g*), and the genio-hyoid unite with the inferior portion of the genio-hyo-glossus in raising and drawing forward the hyoid bone, and thus facilitating the protrusion of the tongue from the mouth. As examples of the second method, we observe that the muscles from the styloid processes to the hyoid bone assist the longitudinal intrinsic muscles of the tongue, by rendering the base a fixed point, from which they can advantageously act on its length. In a similar way the inferior set of hyoidean muscles, by tying the bone down, aid the action of the hyo-glossus, and give additional fixity to the base of the tongue.

The arteries of the tongue are chiefly derived from the lingual branch of the external carotid, though it also receives small branches from the facial and ascending pharyngeal.

The lingual artery (Fig. 3, *b*) takes its rise from the external carotid, between the superior thyroid and the facial. Its course is directed upwards and inwards across the greater cornu of the hyoid bone; then it passes upwards and forwards

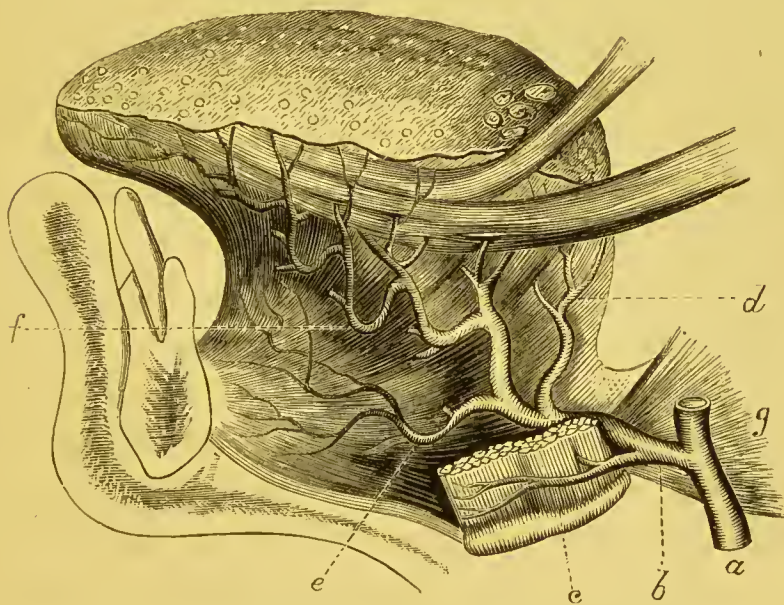


FIG. 3.—*a*, external carotid artery; *b*, lingual artery; *c*, the hyoid branch; *d*, the arteria dorsalis linguae; *e*, the sublingual branch; *f*, the ranine; *g*, the middle constrictor muscle of the pharynx.

to the under surface of the tongue, which it follows as far as the tip. In the first part of its course it rests upon the middle constrictor of the pharynx, and is covered by the platysma and deep fascia of the neck. The second portion lies also upon the middle constrictor, and is covered first by the tendon of the digastric and the

stylo-hyoid muscle, and subsequently by the hyo-glossus. Its third portion rests upon the genio-hyo-glossus; while its termination, under the name of the ranine artery, runs forward on the under surface of the tongue to the side of the frænum.

The branches of the lingual artery are the hyoid (Fig. 3, *c*), which runs along the upper surface of the hyoid bone; the *arteria dorsalis linguæ* (Fig. 3, *d*), which passes upwards beneath the hyo-glossus muscle, and supplies the back part of the tongue, the epiglottis, the tonsil, and the soft palate; the sublingual (Fig. 3, *e*), which is given off near the anterior border of the hyo-glossus muscle, and passes outwards and forwards to the sublingual gland; and the terminal branch, the ranine (Fig. 3, *f*), which lies outside the genio-hyo-glossus muscle, and, near its termination, rests upon the lingualis, covered only by mucous membrane.

The vessels which supply the papillary structure of the tongue ramify in the submucous layer of arcolar tissue, where they form a kind of plexus. Each simple papilla is furnished with a vascular loop. One or more small arteries enter each compound papilla, and from these minute twigs are given off to the secondary papillæ.

The dorsal surface of the tongue is abundantly supplied with lymphatics, and at the base and sides of the organ there are numerous lymph-glands. These correspond with the superficial and deep layers of the absorbent system of the head and neck. The superficial are placed beneath the chin, along the jaw, and at its angle; and they are continuous with those at the upper part of the sterno-mastoid muscle. The deep glands are scattered along the same

lines, but they are most numerous near the angle of the jaw, below the parotid. These latter are the glands which are usually the first to be affected in tongue disease; but sometimes the whole of both layers become enlarged and indurated, as in advanced cases of cancer, adding greatly to the sufferings of the patient. A beautiful representation of the lymphatics which ramify on the surface of the tongue is given in Sappey's "*Traité d'Anatomie.*"

The principal nerves of the tongue are three in each symmetrical half:—1st, the lingual branch of the inferior maxillary division of the 5th (Fig. 4, *g*), which is distributed to the mucous membrane at the sides and tip; 2nd, the glossopharyngeal (Fig. 4, *m*), which is distributed to the mucosa at the base and sides, and to the circumvallate papillæ; 3rd, the hypo-glossal (Fig. 4, *n*), which supplies the extrinsic and intrinsic muscles. Of these nerves the two former are sensory, the latter is a purely motor nerve. Besides these, the chorda tympani, which is given off by the facial nerve, meets the lingual branch of the fifth at an acute angle, proceeds to the submaxillary ganglion, and then reaches the lingualis muscle. It is not improbable that it becomes superficial near the tip, thus assisting to supply that most active and sensitive portion of the tongue with tactile power.

These are the only nerves which are directly concerned in the peculiar functions of the tongue, but there are others which have an indirect connection with them. Thus the superior laryngeal branch of the pneumogastric supplies the epiglottis and the rima glottidis; and some of its fibres can be traced to the neighbouring part of the root of the tongue,

which they help to furnish with common sensation. Again, in like manner, those branches of Meckel's ganglion which are distributed to the arch of the soft palate and the anterior pillars of the fauces, send a few filaments along the palato-glossi muscles to the sides of the tongue.

If now we revert to the three main nerves, we notice that each of them has numerous connections, which bring them into relation with important nervous centres. Thus the lingual branch of the 5th, by means of the Gasserian ganglion, puts the tongue in relation with the whole of the parts supplied by the trigeminal nerve; while the chorda tympani unites it to the facial and auditory nerves. Again, the glosso-pharyngeal puts it in connection with the whole distribution of the eighth nerve—that is to say, with the spinal accessory, the pneumogastric, and their offsets; while by its communicating branches it is directly linked to the hypoglossal. Again, the hypo-glossal is not merely the trunk nerve of the descendens and thyro-hyoid branches of the ninth, but it has also two communicating branches from the cervical sympathetic, and one from the first cervical nerve.

Thus it will be apparent that the nervous connections of the tongue are very extensive, and there is no wonder that it sympathizes in such a remarkable manner with derangements in many parts of the system. The accompanying diagram (Fig. 4), has been drawn out in order to show at a glance the nerves of the tongue and their connections; and by familiarizing ourselves with these, it will be easy to trace remote sources of irritation, which, by direct or reflex action, make themselves visible on its surface.

The ultimate distribution of the nerves to the papillæ has been the subject of much minute research. It appears now to be established that all the papillæ are supplied with a central plexus, though the exact structure of this

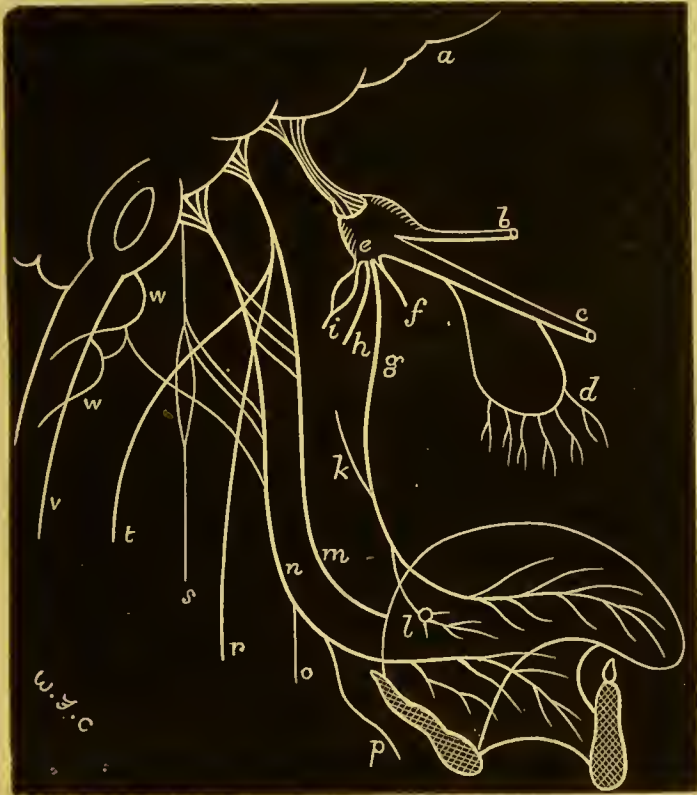


FIG. 4.—*a*, the encephalon; *b*, ophthalmic division of fifth; *c*, superior maxillary division of fifth; *d*, dental branches; *e*, inferior maxillary division of fifth; *f*, buccal branch; *g*, lingual branch; *h*, inferior dental; *i*, auriculo-temporal; *k*, chorda tympani; *l*, sub-maxillary ganglion; *m*, glosso-pharyngeal; *n*, hypo-glossal; *o*, descendens noni; *p*, thyro-hyoid; *r*, pneumogastric; *s*, cervical sympathetic; *t*, spinal accessory; *v*, spinal cord; *w*, first and second cervical nerves.

plexus differs in the several varieties. In the circumvallate, there is a central plexus for the papilla itself, and another for the fosse; in the fungiform, there is a main loop, from

which ramify the lateral filaments, anastomosing with one another. In the filiform papillæ the nerves are scarcely visible, and in some even seem to be wanting. Krause and some other modern anatomists assert that they have traced the nerves to the very surface of the papilla, and that they have found them terminate in a rudimentary corpuscle of touch, which occupies the summit of the fungiform, and is less elevated in the filiform and circumvallate. (Sappey, "*Traité d'Anatomie.*")

It is sometimes a question whether the vessels and nerves in the two halves of the tongue inosculate or have a free communication with one another. In the Museum of Charing Cross Hospital there is a preparation which goes far to settle this point. It consists of the tongue of a foetus, in which one lingual artery has been injected with vermilion. The line of demarcation between the two halves is clearly and sharply defined; the contrast between the bright scarlet of one side and the white of the other is striking, and it is only a very little at the base, in the neighbourhood of the circumvallate papillæ, and also a very little at the tip, that the injection has passed across the middle line of the organ, and that only to a trifling extent. In the Museum of the Royal College of Surgeons there is a preparation (No. 1526, *a*), which illustrates the same point.

From this it is evident that there is no free communication between the vessels of the two sides of the tongue. This anatomical fact is confirmed by the clinical histories of cases of unilateral glossitis, unilateral hypertrophy, and unilateral atrophy, to which I shall hereafter allude, and which

seem to show that there is little or no connection between either the blood-vessels or the nerves of the two halves of the organ.

The two symmetrical halves of the tongue are divided by a septum, composed of dense areolar tissue, which arises from the hyoid bone and extends the whole length of the organ. It is thicker and higher at the back than in front, and has throughout something of a eribriform arrangement, so as to allow of the passage of the transverse muscular fibres. The whole of the tongue is invested by a similar covering of areolar tissue, which underlies the mucous membrane; and into this the intrinsic muscular fibres are inserted in small bundles (see Fig. 2).

The mucous membrane of the tongue is continuous with that which lines the mouth; and indeed that portion which is spread over the under surface is smooth and simple, and differs in no respect from that which covers other parts of the oral cavity. But the whole of the lateral and dorsal portions are peculiarly modified, so as to increase the extent of the tactile, gustatory, and lubricating surface, and to serve the special functions with which the organ is endowed.

The lingual mucosa is studded with simple papillæ, which are analogous to those of the skin. They are found chiefly in three situations—on the under surface of the free portion, in the hollows between the compound papillæ, and at the back, behind the line of the circumvallate. Fig. 5 represents a few of these papillæ from the under surface. The epithelium has been removed; but in their natural state they are thickly overlaid with it, so that the surface is not

rough, but merely undulating. Besides these, the tongue is furnished with three distinct varieties of compound papillæ, which are called the circumvallate, the fungiform, and the filiform. By their elevation these increase enormously the extent of the sensitive surface.

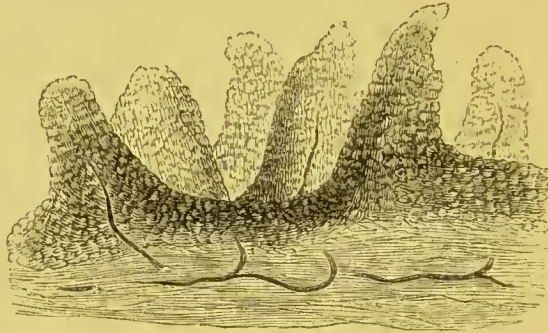


FIG. 5.—Simple papillæ. $\times 300$.

The circumvallate or caliciform papillæ (Fig. 1, *a*) are about eight or ten in number. They are placed at the back part of the tongue, and form an irregular row on each side, inclining a little from before backwards towards the median



FIG. 6.—Two circumvallate papillæ. $\times 60$.

line. At their point of junction is the *foramen cæcum* of Morgagni. Each circumvallate papilla consists of a broad,

flat elevation, which is surrounded by a fossa. The surface is covered with very minute secondary papillæ, and the whole is overlaid with tessellated epithelium. Fig. 6 is a vertical section of two such papillæ found side by side. On either hand are portions of mucous membrane, studded with simple papillæ. On the upper surface of each circumvallate papilla, wherever the epithelium has been removed, the secondary papillæ are visible.

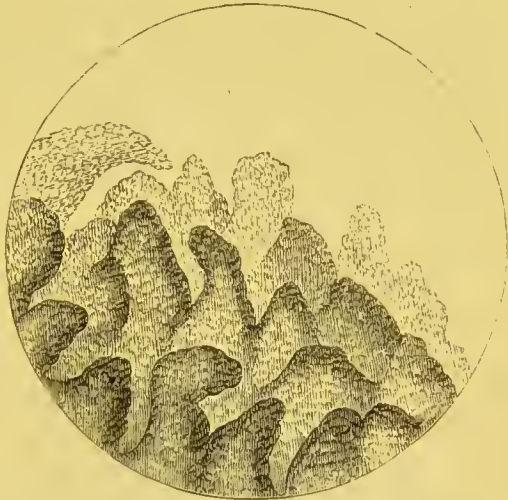


FIG. 7.—Secondary papillæ on a circumvallate papilla. $\times 300$.

Fig. 7 gives a portion of the crown of the right-hand papilla more highly magnified. In irritable conditions of the tongue and throat, these papillæ often become much enlarged, and very prominent. Morgagni mentions that he was called in consultation on a case of inflammatory sore throat, in which they had been mistaken for warts. He assured the patient that they need cause him no uneasiness, and advised the surgeon to pay more attention to anatomy! (Ep. 50. "De tumoribus.")

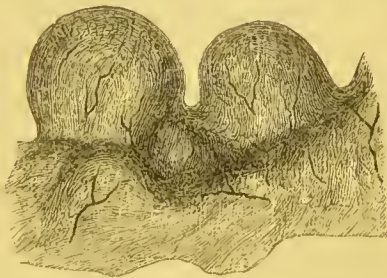


FIG. 8.—Two fungiform papillæ. $\times 60$.

The fungiform papillæ (Fig. 1, *b*) are found scattered,

singly or in small groups, all over the anterior two-thirds of the dorsum and sides of the tongue. They are not so large as the circumvallate, but in shape and structure they are very similar. They form rounded eminences with slightly constricted bases. Those which are represented in Fig. 8 are invested by epithelium; but if this is removed, and they are examined with a higher magnifying

power, they are found to be covered with secondary papillæ (Fig. 9). Their epithelial clothing is thin, and they are thus of a brighter and redder colour than the other papillæ, and frequently stand out conspicuously from the pale mucous membrane around, or from a fur-coated tongue.

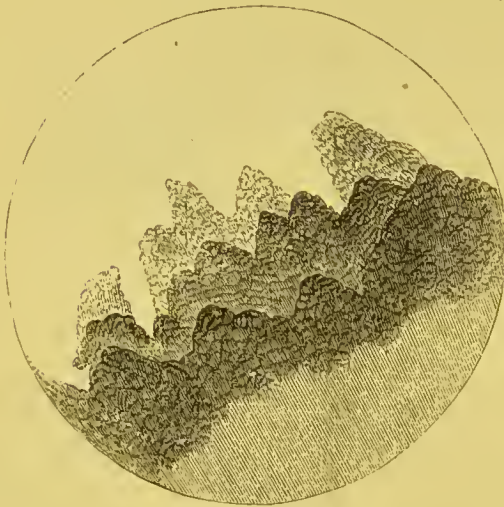


FIG. 9.—Secondary papillæ on a fungiform papilla. $\times 300$.

The filiform papillæ are met with all over the

dorsum of the tongue anterior to the line of the circumvallate. They consist of a body which has sometimes a conical, sometimes a cylindrical, sometimes a barrel-shaped form, and which terminates in a bunch of thread-like secondary papillæ. As Dr. Hassall has pointed out, they have a hollow or depression in their centre, and around this the secondary papillæ are arranged in a circular manner, reminding one of the tentacula of actinæ. They differ much in size. The most typical specimens are found

about the middle of the organ. They are disposed in lines which are directed inwards and backwards towards the median raphé. They are higher and narrower than either of the preceding varieties, and they are also whiter, owing to the thickness of their epithelial covering, which becomes sodden and opaque. In morbid conditions, attended by long-standing local irritation, they sometimes attain an extraordinary length and development; while in cases of gastric or intestinal irritation it frequently happens that their epithelium is shed too rapidly, giving the tongue a preternaturally clean and raw-looking aspect. A group of these papillæ is seen in Fig. 10. It will be



FIG. 10.—Filiform papillæ. $\times 60$.

observed that they differ much in the number and length of their thread-like processes. In some the filaments are short and turn inwards, and the appearance of these somewhat resembles the fungiform. Fig. 11 shows one of these bunches of thread-like processes under a higher magnifying power, and Fig. 12 represents a few of the various forms that the filaments assume. The imbricated arrangement of the epithelial scales on the secondary papillæ is

well seen in *a* and *b*, while *c* shows a stem entirely clothed with epithelium.

Papillæ are found which are more or less intermediate in shape and size between the three varieties I have described—in fact it may be said that one form passes



FIG. 11.—Filiform papilla.
× 300.



FIG. 12.—Filaments of a filiform
papilla. × 300.

gradually into another. But if typical examples of each be taken, they have the general characters already indicated. Great differences exist with regard to the development of the papillæ in different individuals. Thus I have seen the fungiform so highly developed, and with such a distinct fosse around them, as to resemble the smaller circumvallate papillæ; and, on the other hand, I have examined tongues in which, even with the aid of a magnifying glass, I have failed to discover any fungiform at all.

The papillæ of the tongue were first observed and described by Malpighi. (1665.) Subsequently Ruysch (1721) gave a fuller account of them. But the most accurate description furnished by any of the older anatomists is that of Albinus. (1754.) He studied them minutely, and divided them into four groups, according to their size, which correspond to the classification adopted by physiologists of the present day. It is worthy of special notice that, under the name of *stamina*, he describes and figures the secondary papillæ ("Academ. Annotat.," tom. i. lib. i. ch. 14, 15).

It has been suggested that varieties of taste may in some way be connected with these different forms of papillæ, and attempts have been made to trace such a connection, but without success. All we can say is this—that the sense of taste is chiefly exercised by the fungiform and circumvallate; the filiform being, on structural grounds, less suited to take part in it. The keenest sense of taste is therefore met with in the anterior and posterior parts of the tongue; while tactile sensibility seems to reside chiefly in the sides and tip of the anterior portion, where it is most wanted to test the qualities of substances, as well as to move onwards morsels of food.

Behind the line of the circumvallate there is an almost entire absence of compound papillæ. Simple papillæ are found, but they gradually become few, scattered, and ill-developed, until towards the epiglottis they cease altogether. The mucous membrane is smooth, but its surface undulates, in consequence of the conglobate glands which lie immediately beneath it. These glands consist of small whitish

bodies, which are arranged round their duets in bunches, like grapes on a stalk. Their duets open into mucous crypts, which can easily be seen with the unaided eye. By introducing a bristle these crypts can be traced beneath the mucosa for a quarter of an inch or more. Dr. Hyde Salter conjectured that they act as reservoirs for the mucus. The *foramen cæcum*, already mentioned, is merely an exaggeration of one of these crypts. Though it is subject to considerable variation in different individuals, yet, in a well-



FIG. 13.—Vertical section of the dorsum behind the circumvallate papillæ. $\times 15$.

marked example, it is as large as a crow-quill, and extends for nearly half an inch backwards and downwards. It is lined with a smooth and very delicate membrane, which, on the floor of the tube, is folded into longitudinal ridges. It may, in fact, be regarded as a modified circumvallate papilla; the longitudinal folds representing the papilla, while the fosse is drawn out into a crypt. It forms a *cul-de-sac*, and into it open the duets of several of the conglobate glands. Fig. 13 is a vertical section of the mucosa behind the

circumvallate papillæ. It will be observed that the surface is devoid of papillæ, that immediately beneath it is a layer of closely-packed conglobate glands, and below these again are the muscular fibres, some of which have been cut transversely, while others are seen crossing each other, and inserting themselves into the submucous areolar tissue.

Conglobate glands, though of smaller size and more thinly scattered, are also found on the under surface of the free portion of the tongue. Blandin and Nuhn have described glands which are sometimes met with near the tip, one on each side of the septum, and which open by several ducts on the under surface.

Some writers, particularly Kölliker, have stated that besides these conglobate glands the surface of the tongue is studded with saccular glands, simple involutions of the mucous membrane furnished with secreting follicles. These I have failed to find in the healthy organ, though I have seen them in a case of cancer. I am, therefore, inclined to agree with Klein and Bötcher in saying that in the healthy tongue there are no such glands; and that, when they are present, they indicate a morbid condition of the mucosa. (Strieker's "Histology," art. Tongue.)

Thus we see that the mucous membrane, where it is reflected from the under surface on to the tip and sides of the tongue, is comparatively simple, but as it rises on to the dorsum and extends backwards, it gradually becomes more highly developed, until it reaches its greatest complexity in the circumvallate papillæ and mucous crypts and conglobate glands, which are so abundant immediately behind them. This is just what we might expect from studying the con-

ditions of taste and deglutition. Taste resides chiefly about the circumvallate papillæ, whose structure seems designed to allow sapid substances to lie in contact with them; and it is here also, just at the point where the morsel of food passes into the grasp of the pharyngeal muscles, that the most abundant supply of lubricating moisture is needed. The mucosa, which, in the anterior part, has been, as it were, boldly projected to constitute the papillary structure, is now involuted to form the ramifying channels of the secreting glands.

The epithelium of the tongue, like that which covers the cutis, is of the tessellated variety; indeed, both in form and arrangement, it closely resembles the cuticle. Speaking generally, it may be said to be divisible into two layers, one of which consists of the more recently formed cells, and is adherent to the basement membrane; the other is superficial, and composed of the older and more flattened cells, which readily fall off. The amount of the epithelial investment varies much in different parts of the tongue. Thus it is more abundant about the middle of the dorsum than it is at the tip, and much thicker on the filiform papillæ than it is on the fungiform. The shape of the individual cells also differs. In the deep layers they are small and circular, but they gradually become elongated and flattened as they approach the surface. The large, flat, superficial cells usually contain a nucleus, and sometimes a nucleolus. Viewed sideways, they are thin and fusiform. Fig. 14, *a*, represents a few of these particles, and shows their pavement-like arrangement; *b* gives a vertical section of the whole thickness of the epithelium, and illustrates the various

shapes which the cells assume. As a rule they are free from colouring matter, but occasionally pigment is developed in them, as in moles on the skin. M. Bertrand reported four examples of pigmented tongues to the Académie des Sciences (Nov. 26, 1855). "In all these cases the colouring matter showed itself in the first instance as an intensely black oval spot on the median line, from whence



FIG. 14.—Epithelium. $\times 300$.

it extended by degrees over the whole surface of the tongue. It remained stationary for about ten days, and then disappeared by degrees in an opposite manner from that in which it had formed—*i.e.*, from the circumference to the centre. It had a yellowish edge, as in a fading bruise. The mean duration of the whole phenomenon was from forty to sixty days. The only inconvenience of which the patients were conscious was a feeling of dryness in the mouth, and a deficiency of saliva. Detergent lotions produced no effect upon its appearance. It was impossible not to recognise it as an unusual production of the same pigment which colours the skin of the negro." It is well known that in some animals, as the giraffe and the parrot, the tongue is always pigmented; while in others, as the sheep and dog, black patches are not unfrequently seen upon it. In "Addison's disease" brownish or bluish-black stains are frequently found on the lips, tongue, and buccal mucosa. Dr. Hyde Salter mentions having seen cases of a slightly different kind, in which there was an enormous

overgrowth of the filiform papillæ, constituting a long fur, and this fur was of a dark sepia colour, almost black. ("Eneye. of Anat. and Phys.," art. Tongue.)

In addition to the mucous glands, of which we have already spoken, there are three large and important glands, whose special office it is to supply the saliva, which is poured into the mouth more or less at all times, but especially during mastication; and as these are apt to be affected in tongue disease, I shall briefly allude to them.

The salivary glands are the parotid, the submaxillary, and the sublingual.

The parotid gland, which is the largest of the three, lies on the outside of the face, in front of the lower part of the external ear. It rests upon the masseter, and occupies the space between that muscle and the ear. Its deep surface is in relation with the external carotid, the posterior auricular, the temporal, and the transverse facial arteries. The duct (Steno's), which is about two inches and a half in length, opens into the mouth opposite the second molar tooth of the upper jaw.

The submaxillary gland (Fig. 1, *h*) lies below the jaw, resting upon the mylo-hyoid and the hyo-glossus muscles. A portion of it passes behind the posterior margin of the former, and turns forward as far as the anterior border of the hyo-glossus. The facial artery lies upon its upper surface. The duct (Wharton's) is about two inches in length. It passes upwards and inwards, lying between the sublingual gland and the genio-hyo-glossus muscle, and opens into the floor of the mouth at the side of the frænum.

The sublingual gland (Fig. 1, *i*) is the smallest of the

three. It lies on the floor of the mouth, beneath the mucous membrane, on either side of the frænum. Its inner surface rests against the genio-hyo-glossus muscle, from which it is separated by Wharton's duct. It has five or six small ducts, one or two of which open into the duct of the submaxillary gland, while the rest open by separate orifices into the floor of the mouth at the sides of the frænum.

When food is taken into the mouth, these glands are stimulated to secrete saliva, and the movement of the muscles in mastication helps to discharge it into the mouth. The saliva when secreted has an alkaline reaction. This is most apparent during digestion. During fasting, however, it soon becomes neutral from admixture with the acid mucus of the mouth. The average quantity secreted in the twenty-four hours is said to vary from two to three pints.

It will now be well briefly to consider the functions of the nerves which supply the tongue. This will lead me to offer some remarks upon the sense of taste, though no attempt will be made fully to discuss that interesting but difficult subject.

As I have already said, the proper nerves of the tongue are three in number. I shall first consider the functions of the lingual and glosso-pharyngeal, and then say a few words about the hypo-glossal.

The sense of taste, which is the special nervous endowment of the tongue, differs from the senses of sight, hearing, and smell in that it does not depend wholly upon a single pair of nerves, and herein it approaches nearer to the sense of touch. With regard to sight, hearing, and

smell, the anatomist can without difficulty trace the medium through which the brain receives its impressions, and the division of a single pair of nerves would entirely destroy any one of these senses. But this is not the case with the sense of taste. As its exercise is spread over a considerable surface, it is a wise provision of nature that it is not altogether transmitted through one channel. Two pairs of nerves take part in its production—the one, the lingual branch of the fifth, is distributed to the sides and tip of the tongue; the other, the glossal branch of the glosso-pharyngeal, to its base and sides.

The sense of taste appears to be, in a more marked degree than the other senses, intimately connected with the sense of touch,—indeed we might, perhaps, say that it is only a modification of it, for it is the same nerves which supply the tongue with common sensation and with taste. It is even a question whether there are any special fibres which are charged with conveying the flavours of solid substances to the brain, as distinguished from those which transmit ordinary impressions; though cases have been recorded which make it extremely probable that there are separate filaments for the exercise of these two functions. Bérard has collected six cases bearing upon this point. In these, common sensation was quite lost, but taste remained unimpaired. (“Cours de Physiologie,” i. 661.)

There have not been wanting distinguished physiologists who have held that the special sense of taste depended upon one pair of nerves alone. Some have pronounced that pair to be the lingual of the fifth, and others the

glosso-pharyngeal. Among the former, we may mention Sir Charles Bell ; among the latter, Romberg.

But when we examine the experiments from which these conclusions have been deduced, it cannot be said that they settle the question in favour of one nerve or the other—rather they show that both nerves are implicated. When the glosso-pharyngeal was divided in dogs, as in Dr. John Reid's experiments, the animals continued to show decided indications of taste ; and conversely, when the lingual was divided, as in Dr. Alcock's experiments, it was clear that the sense was not wholly lost.

If we turn from direct experiments upon animals, and study cases of disease which have been noted in the human subject, and which bear upon this question, we are led to the same conclusion—namely, that both nerves take part in the sense of taste, or at least that the integrity of both is necessary to its prompt and perfect accomplishment. An interesting case has been related by Todd and Bowman, which illustrates this point. “ A middle-aged man suffered for eight years from complete loss of sensation in all parts supplied by the fifth nerve on the left side, with the exception of the forehead. The left eye was lost by destructive inflammation ; the tongue was quite without feeling on the left side. On experimenting on his sense of taste, it was found to be clearly absent in the anterior and middle part of the affected side, but to be present behind, in the region supplied by the glosso-pharyngeal. He tasted acutely enough on the other side.” (“ Physiology,” i. 444.) And Dr. Althaus has more recently put upon record a case in which there was complete loss of function of the

whole fifth pair, unaccompanied by any other affection of cerebral or nervous matter, and in which the sense of taste was much blunted at the anterior part of the tongue, though it remained acute at the posterior. ("Med. Chir. Trans.," vol. lii.)

It has lately been maintained that the sense of taste possessed by the lingual branch of the fifth is derived from the seventh through the chorda tympani. The evidence in favour of this statement is chiefly pathological; but without denying the possibility of the chorda conveying the sense of taste, it is difficult to suppose that this sense can be derived from a purely motor tract, such as that in which the *portio dura* arises. That it takes part in conferring common sensation upon the tip of the tongue is, as I have said, quite possible, and there can be no doubt that the integrity, not merely of the chorda, but of all the nerves that are in close association with the lingual of the fifth and the glosso-pharyngeal, is necessary for the perfect fulfilment of taste. When the *portio dura* is paralysed, both the movements of the tongue and the sense of taste are impaired.

Though the tongue is unquestionably the chief seat of taste, yet the special sense is not altogether confined to this organ. The soft palate and its arches, as well, perhaps, as the gums and the floor of the mouth, are feebly endowed with it. This may easily be ascertained by experiment, and the cases which I have elsewhere related, in which the tongue was either congenitally absent or had been cut out or lost by disease, go to prove the same fact. It would seem that those parts whose nervous supply is intimately connected with the lingual and glosso-pharyngeal nerves

have a slight appreciation of taste, and that this appreciation can be heightened by habit and use.

The common sensation of the tongue is almost entirely derived from the same nerves that convey the impressions of taste; the anterior and lateral portions being supplied by the lingual branch of the fifth, the posterior by the glosso-pharyngeal.

The papillæ which minister to the sense of taste are, as I have said already, chiefly the fungiform and the circumvallate. At least it is difficult to suppose that the filiform, which are covered with a dense investment of epithelium, and which in some animals are quite horny, can take much part in the exercise of this sense. Thus some portions of the tongue are more highly endowed with taste than others; for, while the filiform papillæ on structural grounds seem but little suited to share in it, the fungiform and the circumvallate are specially adapted to receive impressions from sapid substances. The former owe their bright red colour to the fact that their epithelium is remarkably thin, while the latter are furnished with a fossa in which the sapid substances, dissolved in the fluids of the mouth, can linger, and thus produce a prolonged impression upon the nervous filaments.

The anterior portion of the tongue is endowed with the special sense of taste in order to give us information respecting the qualities of substances at their entrance to the mouth; while the posterior part is richly furnished with the nerves which convey the special sense in order that we may derive gratification from its exercise. This seems the more evident when we consider how much the

sense of smell contributes to enhance the sense of taste, for it is when the sapid particles, in a volatile form, rise to the posterior nares that our appreciation of them is the keenest. Indeed, the olfactive sense is very closely connected with the gustative. The odorous emanations from such substances as are capable of giving them off, heighten their flavour; and the combined action of the nerves of taste and of smell produce a single impression upon the sensorium. It is a matter of common observation that some things smell like a taste—the impression produced upon the brain through the olfactive sense, as it were, reminding it of similar impressions that have been made upon it through the gustative.

In some rare cases the sense of taste has been wanting altogether. Persons have been born with defective nerves of taste, just as others have been born with defective nerves of hearing or of sight. And it is worthy of notice, as showing how closely the nerves of taste and of smell are associated, that a defect in the one is almost always accompanied by a defect in the other.

When the tongue is diseased, or when the general health is disordered, the sense of taste is apt to undergo modifications, and occasionally strange perversions. In some cases one thing tastes like another; in other cases everything tastes like a given substance. It is well known that in some aggravated cases of hysteria the sense of taste sometimes becomes morbidly acute; while in others the patient refuses wholesome food, and eats things the most loathsome and disgusting. The same occurs in a milder form in many disordered states of health. The patient desires articles of food which are clearly unsuitable to his

case, and calculated rather to injure than to benefit him. In other cases, again, it becomes a difficult question for the physician or surgeon to settle how far he may, with propriety yield to the wishes of his patient in respect to diet. Very often the cravings of nature may be taken as a trustworthy guide—"Nunquam aliud natura, aliud sapientia dicit." (Juv. xiv. 321.) At other times the appetency depends so clearly upon a vitiated state of the secretions that it is unwise to yield to it.

The sense of taste is sometimes temporarily, or permanently, impaired by blows or falls on the head, and in such cases the sense of smell is generally more or less affected also. The explanation of these phenomena is difficult and obscure. In the slighter cases they probably arise from mere concussion of the brain, which has been followed by disturbance of the circulation and nutrition. In other, and graver cases, there may be rupture of nerve-fibres at the base of the brain. In other cases, again, the stress of the injury may fall on the cervical ganglia of the sympathetic. In some instances the impairment of taste rapidly passes away, and the sense is perfectly restored; in others it remains for weeks or months; and in others, again, it becomes permanent. In these last cases the injury has been so great that repair is impossible, and then atrophy of a portion of the nerve, or of the tract from which it takes its origin, has been the result. We not unfrequently see parallel cases occurring in respect to the sense of sight, and by means of the ophthalmoscope we can note that blindness has come on *pari passu* with the atrophy of the optic nerve.

The sense of taste, like the other senses, admits of being educated to an extraordinary degree of perfection; and tasters of wine, tea, &c. acquire a power of discrimination which is surprising. Thus, Dr. Carpenter says that the taster to one of the extensive cellars of sherry at Cadiz or Seville has not the least difficulty in distinguishing the butt from which a given sample has been drawn, although the number of varieties of the same kind of wine under his keeping may not be less than five hundred. ("Eneye. of Anat. and Phys.," art. Taste.) The same thing, in a less degree, is often seen in those who devote much of their attention to the pleasures of the table. The way in which the taster discriminates the flavour of the wine or tea in question gives a good example of the conditions under which the sense acts most promptly and delicately. A small quantity is taken into the mouth, moved rapidly over the surface of the tongue, and then discharged. Such movement serves to excite the sensibility of the nervous filaments, while they are not exhausted by a long-continued exercise of their functions; at the same time the mucus and effete epithelium is washed away, and the surface rendered more susceptible to impressions. It is just in the same way that the sense of smell acts the most keenly, when the air, charged with scent, is drawn rapidly over the Schneiderian membrane by a series of short sniffs.

On the other hand, if the nerves of taste are constantly plied with a strong flavour, or with one strong flavour after another, they become exhausted, and for a time lose their power of discriminating savors altogether. The nervous force is expended, and there is need of a season of repose in order that it may be renovated.

The hypo-glossal is purely a motor nerve, and is distributed solely to museles. That such is its character may be demonstrated by direct experiment upon animals, for it can easily be reached beneath the jaw, where it lies below the tendon of the digastric and above the cornu of the hyoid bone. If it be divided in this situation in a rabbit, it is at once evident that the museles of the tongue on that side are paralysed, for the animal puts its tongue out strongly towards the side that has been operated on, as if it were licking that corner of its mouth. This arises from the fact that the unparalysed museles raise the hyoid bone, thus tilting the base upon which the tongue rests; and when the linguales of the sound half are extended, not being counteracted by their fellows, they carry the point still further over towards the affected side. Thus both extrinsic and intrinsic museles combine to produce the lateral deviation.

The effects which are noted in cases of disease of the hypo-glossal nerve quite accord with the results of experiment; but I will not dwell upon them at present, as this subject will be more fully considered in the chapter on Atrophy. I have there brought together some remarkable instances, in which either the whole or the half of the organ was wasted from disease of one, or both, hypo-glossal nerves, and in which its movements were proportionately affected. Suffice it to say here, that the evidence afforded by direct experiment, and by pathological observation, puts it beyond a doubt that the ninth pair of nerves takes no part in supplying the tongue either with common sensation, or with the special sense of taste.

CHAPTER II.

THE EXAMINATION OF THE TONGUE.

IN the ordinary practice of our profession we constantly desire the patient to "put out his tongue," and there is much which we can learn with respect to the condition of his general health from a simple glance. But when the tongue itself is the seat of disease, when we examine it, not as the index of the constitutional state, but in order to ascertain what local changes have taken place in it, then we must be more exact in our scrutiny. We must not be contented with merely scanning the dorsum, but we must examine the sides, and the under surface as well; and in some cases the state of the gums, and of the lining membrane of the cheeks and lips, throws an important light upon the case. For example, a decayed tooth, or a little irregularity in the fastening of artificial teeth, may at once explain the presence of an ulcer; a sore throat, or cracks and fissures on the inside of the lips, and at the angles of the mouth, may indicate the syphilitic nature of a tumour in the substance of the organ. But this is not all. I have known the state of the tongue throw a most important light upon surgical disease of distant parts, and indicate the syphilitic origin of a swelling about the diagnosis of which there was a doubt, or give the clue to the proper treatment of an intractable ulcer. It is

therefore of great importance to make a thorough examination of the whole of the interior of the mouth in surgical as well as in medical cases. Van Swieten's advice applies equally to both:—"Medici prudentes nunquam ab ægris discedunt, nisi prius inspexerint oris interna et linguam." ("Commentaries on Boerhaave," § 85.)

With this object it is desirable that the patient should be placed in a full light, and that, if need be, the tongue should be depressed with a spatula, or held up by means of the little instrument which is used in dividing the frænum linguæ (see Fig. 15), so as to examine its under surface and the hypo-glossial region. In like manner the sides of the organ should be brought into view, and in some instances the tongue may be pressed to one side, so as to make a thorough inspection of the other.

The most convenient form of spatula for depressing the tongue is one made of metal. This is cleaner, and more agreeable to the patient, than an ivory or wooden one. It ought to be broad enough to cover the whole, or the greater part of the tongue, that so the surgeon may be the better able to control its movements. If it has a hinge in the centre which permits it to open to a right angle, this not only supplies it with a convenient handle, but also makes it easy to carry in the pocket-case. I myself use one of this kind, which has been modified by having the second blade deeply notched or forked, so as to facilitate the examination of the under surface. Thus, one blade serves to depress the tongue, and the other to elevate it. This instrument will be found very convenient in some of the operative proceedings, which I shall hereafter have to describe.

To obtain a clear view of the surface of the tongue, I am in the habit of using a hand magnifying glass. This is often a great assistance. By its help one can frequently distinguish a slight ulceration or a small sear, which would otherwise escape detection. It is useful too in certain cases to obtain accurate information with regard to the papillæ, or the nature of the fur upon the dorsum. For these, and other reasons of a like kind which might be mentioned, the surgeon, who wishes to make an exact diagnosis of the state of the tongue, ought always to have a lens at hand.

In some instances great assistance is derived from the use of the laryngoscope, which enables us to examine the back part of the tongue and the epiglottis. But it is not merely in gaining a view of these parts that this instrument is of service. Sometimes it enables the surgeon to make applications to the back of the tongue, or even to perform operations upon it, which would be almost impossible without its aid. He ought, therefore, to be provided with a laryngeal mirror, as it is only in that way that some tumours and ulcers situated far back on the dorsum can be seen, and yet it may be of the utmost importance as an element in the diagnosis that we should gain a clear view of the whole disease.

It is scarcely necessary to say that the point of the finger will often supply us with information, which can be obtained in no other manner. By its help we are able to ascertain the presence of tumours, to estimate their density or elasticity, to distinguish mere folds of the mucous membrane from fissures which pass deep into the

substance of the tongue, as well as to detect the presenee of fluid by the feeling of fluetuation.

It is advisable also that the surgeon should have litmus and turmeric paper at hand, so as to test the eharacter of the secretions of the mouth ; and in some cases interesting and even important information will be obtained, espeecially with regard to the presenee of minute fungi and parasitic growths, by submitting portions of fur to the microseope.

As we proceed we shall have many opportunities of observing the importance of these different methods of exāmining the tongue.

CHAPTER III.

CONGENITAL DEFECTS OF THE TONGUE.

FROM what we have seen of the complex structure of the tongue, the reader will be prepared to hear that it is subject to many congenital defects.

In some very rare cases the organ has been altogether absent. An example of this peculiarity has been described at length by M. de Jussieu. It is of so much interest that I shall give an abstract of it, translated from the original narrative. He says:—

“I announced to the Academy in April last that I had the honour of writing to them from Lisbon the observations which I there made upon a girl who was born without a tongue, and upon the way in which she acquitted herself of those functions which are usually performed by that organ. The girl referred to was the child of poor parents. She was born in a village of Allentijo, a small province of Portugal. At the age of nine years she was shown to the Count of Ericeira, a man distinguished as much for his learning as for his nobility. The novelty of the circumstance having excited his curiosity, he sent the girl to his house at Lisbon, that he might satisfy himself about her at his leisure. Here I saw her on two consecutive occasions, and examined her with all possible attention.

“She was then about fifteen years of age, and was quite

sufficiently intelligent to answer all my questions as to her condition, and the manner in which she made up for the want of this organ. In the evening by candle-light, and the next day in broad daylight, I made her open her mouth, in which, instead of a tongue occupying its usual position, I remarked only a small elevation, in the form of a mamelon, which rose in the middle of the mouth to the height of about three or four lines. This elevation would have almost escaped my observation if I had not assured myself of its existence by touch, for it was scarcely visible. In pressing it with my finger, I felt a sort of movement of contraction and dilatation, which showed that although the organ of the tongue was absent, yet the muscles which form it, and which are designed to move it, were present; for there was no hollow under the chin, and I could only attribute the alternating movements which I have described to these muscles.

“ Having convinced myself of the relative position of all the parts of the mouth with regard to the absence of the tongue, I next proceeded to examine particularly the manner in which this girl performed the functions to which this organ is usually destined.

“ The first, that of speech, she performed so clearly and distinctly that one would not have known, unless one had been told, that the organ of speech was absent. She pronounced before me not only all the letters of the alphabet, but also many separate syllables, and even complete sentences. I remarked, however, that she pronounced some of the consonants, such as C, F, G, L, N, R, S, T, X, and Z with more difficulty than the other letters, and that when she

had to utter them slowly or separately, the pains which she took to sound them were shown by bending her head forward so as to bring her chin nearer to the throat or larynx, thus raising the latter and placing it almost on a level with the teeth.

“The second function of the tongue, that of taste, is nearly as perfect as with us. She can distinguish the qualities of substances almost as well. I proved this by the pleasant taste which she discerned in some sweetmeats which were given to her.

“It appeared to me that she found more difficulty in mastication, for the little elevation which I have noticed in the centre of the floor of her mouth was not large enough to pass the pieces of solid food backwards and forwards between the jaws so as to reduce them to pulp. This defect she endeavoured to supply by the use of her lower jaw, which she first advances and then withdraws from the molars of the upper jaw, under which is placed the morsel of food which she wishes to break. She sometimes even makes use of her fingers to assist her.

“But for no other purposes are her fingers so serviceable to her as for the deglutition of solids, for which the tongue is so necessary, in order to conduct them directly to the pharynx, when they have been properly prepared by mastication, and which the tongue collects, as with a spoon, from all sides of the mouth, gathering up even the minutest fragments. This is chiefly the case either when the mouthfuls of food are tougher than usual, and therefore require a longer time to become moistened, or when they need a larger quantity of saliva to saturate them. In this case

the salivary glands, being already exhausted by long mastication, are unable to supply an amount of moisture sufficient to cause the particles to flow easily of themselves to the entrance of the œsophagus.

“ Her manner of swallowing fluids only differed from the ordinary method in this—that she took the precaution not to take so large a quantity of fluid at a time into her mouth as other persons, and also to incline her head a little forwards in swallowing, so as to diminish the abruptness of the downward flow which there would be if she held her head straight, and she thus lessened the danger of choking. The little elevation in the middle of her mouth is by no means useless in preventing too great a flow of liquid down her throat, as it presents a slight obstacle to the stream, and obliges it to divide and take the same course that liquids generally do. . . .

“ One circumstance in connection with this girl’s rearing is curious. While being suckled by her mother, she could not draw the milk in the usual way; the tongue being necessary to collect the fluid and conduct it to the throat. The mother perceived her child’s difficulty in sucking, and the only way in which she could counteract it was to press her breast, and so cause the milk to flow into the infant’s mouth, while the child held the nipple tightly between its lips.

“ This singular fact of a mouth which could speak though it contained no tongue, ought to convince us that the presence of a tongue is not absolutely essential to speech, since there are other organs in the mouth which contribute to produce articulate sounds, and which can supply the lack of it. The uvula, the nares, the palate, the teeth,

and the lips are all so much concerned in speech that whole nations are distinguished by the manner in which they make more or less use of one or other of these parts.

“Some persons, perhaps, who doubt the possibility of any one speaking without a tongue, may imagine that in the case of this girl it was not really absent, but that by some natural accident it was adherent to the lower or lateral portions of the mouth. But an inspection will at once remove this impression; for not only is its cavity larger than usual, but at the back the uvula is distinctly visible, and is seen to be more than double the usual length, and also a little thicker than ordinary. It stretches almost to the epiglottis, and forms at the back of the throat two equal rounded openings instead of one; while in other subjects the aperture, though single and larger than the two together in this case, can only be seen by pressing down the base of the tongue.” (*Mémoires de Mathématique et de Physique tirés des Registres de l'Académie Royale des Sciences.* Paris. 1718.)

This Portuguese girl was seen also by Dr. Willcox, Bishop of Rochester. His attestation of the case may be found in Wanley's “*Wonders of the Little World*,” edition of 1806, vol. i. p. 31.

To find the tongue entirely adherent to the floor of the mouth is another congenital defect of very rare occurrence. The only instance I have found on record is mentioned by M. Sernin of Narbonne. An infant, three months old, was brought to him on account of difficulty in sucking. On examination he found that the tongue was adherent

to the lower jaw throughout its whole breadth. The free portion between the point of adhesion and the tip was only about two lines in length. No sign of a frænum was visible beneath. The tongue was shorter, thicker, and firmer than usual. It could neither be lengthened nor folded back, nor make any movement which was sufficient for suction. By carefully dissecting underneath the tip, it was entirely freed. There was scarcely any hæmorrhage, and the child obtained immediate relief. The only precaution taken to prevent re-adhesion was to pass the finger, or a camel's-hair brush, dipped in sugar and water, two or three times a day between the cut surfaces. When the child was exhibited at the Academy two years later, the cure was complete, and she could speak as well as others of her age. ("Mém. et Prix de l'Acad. de Chir.," vol. vii.)

Sometimes, though very rarely, the tongue is bound down by membranous bands or folds of the mucous membrane, placed either at the sides or at the under surface of the organ, and attaching it to the adjacent parts of the mouth. Maurrain relates three such cases. ("Mém. et Prix de l'Acad. de Chir.," vol. vii.) A similar condition is from time to time met with in adults, as the result of sloughing. In congenital cases the membranous bands may either be divided with blunt-pointed seissors, or with a scalpel; or, if they are too thick and too extensive to be treated in this manner, a ligature may be passed round them and tied tight, so as to bring about their division.

Occasionally children have been born with tongues which were more or less bifid. This condition is normal in certain animals, as the seal; in some birds, as the raven;

and in many reptiles; and any one who has studied the human tongue closely, and has noted how much the depth and distinctness of the raphé varies in different individuals, will easily believe that occasionally there may be such a thing as a split tongue. If in such a case the notch is so deep as to call for any interference, there is no reason why the surgeon should not pare the edges and bring them together with stitches, in the way so successfully practised in dealing with a split palate or uvula.

Fournier alludes to cases in which the tongue is unusually thin and long; and mentions a lady whose tongue was thinner than a cat's, and, when she laughed, formed folds over her teeth like drapery. He also knew a girl whose tongue was so long that, when she held her head erect, she could touch her chest with the tip, though she had rather a long neck! ("Nouveau Dict. des Sci. Mcd.," art. Cas rares.)

But these malformations are mere *lusus naturæ*. They are interesting to the physiologist, but they are so uncommon that they cannot be said to have much practical importance. We shall turn, therefore, at once to the consideration of other congenital defects, which are more interesting to the surgeon, because they are more frequently met with.

Of hypertrophy of the tongue, or *prolapsus linguæ*—an affection which is generally, though not always, congenital—I shall speak at length in Chapter V.

The commonest congenital cases in which the surgeon is consulted are those in which the child is "tongue-tied." Here the *frænum linguæ* is too short, or comes further

forward than it should, and thus restrains the movements of the anterior portion of the organ. The infant cannot put out its tongue or use it in sucking. In a well-marked example the tip of the organ seems to be bound down to the floor of the mouth, and if this state of things is allowed to remain uncorrected it seriously interferes with the rearing of the child, and subsequently with the distinctness of its speech. As we might expect, this imperfection is sometimes found to be hereditary.

The remedy for this defect is simple and effectual. The infant's mouth being held open, the surgeon takes the frænum between his left forefinger and thumb, puts it gently on the stretch, and snips it with a blunt-pointed pair of seissors; or the tongue may be pressed upwards, and the bridle made tense, by means of the little instrument which has been devised for the purpose, and which consists of a small flat shield with a deep notch for the reception of the frænum. This shield is placed upon a stalk about four inches long, which is grooved so that it

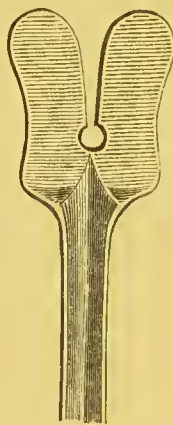


FIG. 15.

may serve as an ordinary director. (Fig. 15.) In using this instrument, the surgeon takes it in his left hand, places the flat shield under the centre of the child's tongue, and then, gently raising it, puts the bridle on the stretch.

If such an instrument is not at hand, one may readily be extemporized by means of a piece of stiff card-board, with a notch cut in it. The depth to which the frænum should be nicked must depend upon the severity of the case, but in most instances an eighth of an inch is

sufficient. The retaining band is generally at the anterior margin, and when this is divided, the rest yields to the movements of the tongue.

Some surgeons, after having put the bridle on the stretch, push the point of a scalpel through it, and cut from within outwards. This method may occasionally have advantages, but for the majority of cases the course I have described will be found the simplest and best. In an infant the jaws can easily be held open by the same forefinger and thumb which grasp the frænum. But in an older child it may be necessary to separate the teeth by a cork or some other suitable gag; and in such a case the little instrument I have described will be found particularly useful by enabling the surgeon to get a good view of the bridle.

Trifling as this operation is, it is important to bear in mind the position of the ranine arteries, and to direct the point of the seissors downwards, towards the floor of the mouth. If this is done, very little bleeding will take place; but if unfortunately the ranine arteries should be wounded, they may give rise to troublesome hæmorrhage. When such an accident occurs, firm pressure should be made upon the wound with the finger, or with a small pad of lint dipped in the muriated tincture of iron, or lunar caustic should be applied. If these means fail, the bleeding point must be seized with a forceps, drawn forward, and twisted or ligatured. If this cannot be done, the actual cautery must be applied to the spot from which the blood is flowing. As soon as the hæmorrhage has been arrested by any of these means, small fragments of ice should be placed in the child's mouth for the next few

hours, to prevent a recurrence of the bleeding. In some very rare cases, in children of the hæmorrhagic diathesis, it has been found impossible to arrest the bleeding by any means, and this trivial operation has been followed by a fatal result. (Ricken, quoted in Dr. Wickham Legg's "*Hæmophilia*," p. 54.) Indeed, in such children bleeding from the tongue, and from the interior of the mouth, is particularly apt to occur without any operation at all. This is no doubt because the parts are highly vascular. During dentition they are congested, the eruption of the teeth thins the mucous membrane, and the teeth in their turn are apt to bite the tongue. In one who is "a bleeder" the slightest abrasion may be followed by free and long-continued hæmorrhage. In such a case full doses of the *tinctura ferri perchloridi*, or small but frequent doses of the oil of turpentine, should be prescribed; while constant but gentle pressure is kept up upon the bleeding point by means of the tip of the finger, or a graduated compress.

"Tongue-tie" is supposed by the public to be much commoner than it really is, and the surgeon is frequently consulted about cases where no interference is necessary. He should therefore be on his guard, and not operate unless he sees good reason. But if the child be really suffering from this congenital imperfection, it ought certainly to be rectified in infancy. If this is not done, it may be long before he is able to speak at all, or he may acquire a defective mode of utterance which no subsequent operation can serve wholly to remove. I have seen a young man, who had been born with this defect, and who had no power to put out his tongue in the least degree, or to raise it to

the roof of his mouth. It seemed tied to the hypo-glossial space ; and, as one might expect, his speech was thick and indistinct. If, unfortunately, a person having such a defective formation of the mouth is allowed to grow up unrelieved, an operation may be undertaken at any time in order to give the organ more mobility, and much may be done by instruction to induce a clearer and more distinct articulation ; but the cure will never be so complete as if the operation had been performed in infancy.

It would be foreign to my subject to enter into a consideration of the various impediments to speech. Some are purely nervous ; some are in a great measure the result of bad habit ; but others depend upon malformations of the mouth, and it is only with these last that I am here concerned.

The operation of "glossotomy" was at one time in vogue as a means of curing stammering. It was first practised by Dieffenbach, in 1841, and after him was variously modified by different surgeons. Speaking generally, the operations which went by this name were of two kinds ; first, those in which a wedge-shaped portion of the tongue itself was excised ; and second, those where the extrinsic muscles, more particularly the genio-hyo-glossi, were divided. The former method was advocated by Dieffenbach, under the impression that stammering proceeded from a want of control over the tongue muscles, especially the linguales, in consequence of their being too long. The latter was practised by Velpeau, Amussat, and others, apparently from the idea that the tongue was deficient in freedom of movement. Experience has, how-

ever, shown that no permanent benefit resulted from these operations. For a time some of them seemed to do good—perhaps from the impression which was made on the mind and nervous system of the patient—but they have long since been abandoned as useless.

Oceasionally an opposite defect exists, and the tongue lacks its proper attachments. It is, in fact, too mobile. To such an extent may this mobility proceed that the free portion may be completely inverted or “swallowed.” When this happens it is grasped by the pharyngeal muscles and drawn downwards, thus tending to block up the throat and produce suffocation. It is said that among the negro races it is a common practice to commit suicide by swallowing the tongue. A writer in “Notes and Queries” has collected from various sources examples of this kind, which at least serve to show the popular belief (Nov. 1858). Crosse knew a lad who could swallow his tongue at will without any serious inconvenience (“Trans. Prov. Med. and Surg. Assoc.,” 1837). Petit has recorded two cases in which the frænum was divided very shortly after birth, and in which the infants both died, suffocated, from their tongues becoming reversed and swallowed. (Quoted by Fairbairn, “Med. Times,” xii. 392.)

Dr. Fairbairn relates two cases in which children were born with the tongue too far back; “retroversion of the base of the tongue,” he calls it. In these there was deficient development of the lower jaw and of the floor of the mouth. The frænum was wanting, and the tongue had retracted to the very back of the mouth. One child died, suffocated, two days after birth. The other was, with very careful

nursing, brought up by hand. ("Med. Times," xii. 392, 1845.)

Oceasionally children are born with tumours of various kinds connected with the tongue.

The most common of these is the cystic formation known as *ranula*, of which I shall have to speak at length hereafter. I have seen a tumour of this description as large as a small grape, under the tongue of a new-born infant. It was composed of a cyst which had a delicate greenish-yellow tint, and was full of a thin, straw-coloured fluid. It was readily cured by raising the cyst-wall with a forceps and cutting off a small portion with seissors.

In the forty-fifth volume of the Philosophical Transactions (1747) a case is related of "a very learned divine, who was born with two tongues." But the editor wisely adds :—"The supposed second tongue here mentioned was probably nothing more than an enlargement of the sublingual gland, which in process of time contracted to its natural dimensions." Other cases of infants born with tumours in the hypo-glossial region, "which had all the dimensions of a second tongue," were recorded by M. Faure of Lyons in 1752. In these instances, as the children were unable to suck, the tumours were cut out with seissors, and the bleeding stopped with *agaric de chêne*. ("Mém. de l'Acad. de Chir.," vol. v.)

Sometimes an erectile tumour, a *nævus*, is seen on the tongue at birth. Here, as elsewhere, such a *nævus* may vary greatly in size. In some instances it is quite small ; in others it may involve the greater part or even the whole of the organ. Some cases of *prolapsus linguæ*, to which I shall

allude hereafter, become so enlarged, and their arteries and veins so congested, that they form a kind of nævoid tumour.

By the kindness of Mr. Speneer Watson I had an opportunity of examining the case from which Fig. 16 is taken. The patient was a young woman, aged twenty-five. When her lips were closed, a small purplish swelling, about

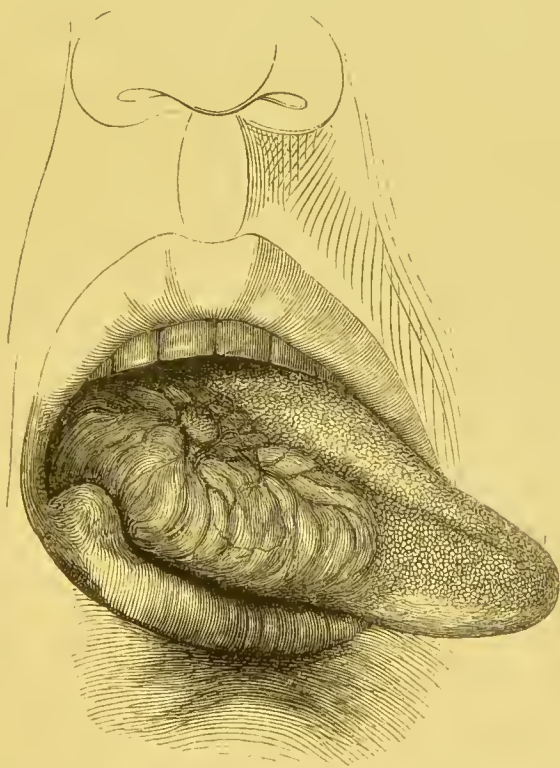


FIG. 16.—Nævus on the tongue.

the size of a currant, was visible at the right angle. When she opened her mouth, this was seen to be continuous with a large irregular patch, of the size of half-a-crown, on the inside of the cheek, extending down to the bottom of the sulcus between the cheek and the gum. The gum was natural; but the tongue took up, as it were, the nævoid tract

again. On the right side of the organ was a large elongated nævus, of the same bluish-purple colour, with bright red points upon it. By gentle pressure the blood could be driven out and the tissue became pale, but it immediately resumed its original hue as soon as the pressure was removed. The nævus was altogether about an inch and a half long by an inch broad. In the centre of this area, where the disease was most marked, the large and tortuous vessels formed elevations fully an eighth of an inch above the surface. At the edges it faded off into the surrounding healthy tissue. It was entirely confined to the right side, and nowhere crossed the median raphé. Under the tongue, on the floor of the mouth, was a separate small nævus, the size of a split pea. The disease had remained in all respects the same ever since the patient could remember, though her mother had told her that at first it had occupied the whole of the inside of the right cheek. It gave her no trouble, and did not interfere in any way with eating or speaking. Common sensation was as acute on the right side as on the left, and she was sure that she tasted equally well on both sides.

Though in this case the disease was of comparatively large extent, it gave no inconvenience, and even that part which was situated on the lip was almost hidden by the shadow at the angle of the mouth. Such being the case, the patient had no desire to have anything done for it, nor was it deemed advisable to recommend any operation. In most instances of nævus on the tongue it is only the rapid extension of the disease, or the serious inconvenience which it causes to the patient, that would warrant the surgeon in

operating. If, however, it is necessary to remove the disease, ligatures may be put round it in the ordinary way, or the actual cautery may be applied by means of the little instrument devised by Mr. Bowman for orbital nævus. A very analogous instance to that which I have detailed, occurred in Mr. Barnard Holt's practice at the Westminster Hospital a few years ago ("Assoe. Journ.," 1857.) A case in which Sir James Paget removed a nævus about the size of a hazel nut from the tongue by a couple of strokes of a strong pair of seissors has also been recorded; but here the tumour appears to have consisted of other elements besides those which are found in the ordinary aneurism by anastomosis. ("Brit. Med. Journ.," 1869, ii. 655.) Mr. Eriehsen mentions and figures a case of a child, three years old, from whom he removed part of a nævoid tongue with the *écraseur*. ("Surgery," 6th ed. i. 720.)

In the twentieth volume of the Pathological Society's Transactions Dr. Hickman has reported a case of a congenital tumour of the tongue of a totally different character, and the morbid growth itself is now in the Museum of the Royal College of Surgeons, No. 1067 *a*. It was met with on the tongue of a female child, who died on the day after her birth, apparently suffocated. The following is Dr. Hickman's account of the case:—"At the centre of the base of the tongue, occupying that part of it which in the natural position is placed vertically in the pharynx, was a prominent, rounded, well-defined tumour, about three-quarters of an inch from before backwards (or downwards in the natural position), half an inch across, and nearly an inch above the general surface of the tongue; this was hard to the touch,

and the surface presented numerous depressions and elevations, having the normal appearance of the mucous membrane of the back of the tongue. At its hinder or lower part it was in contact (but not connected in any way) with the epiglottis; and when the parts were placed in the position they must have occupied when *in situ*, the tumour completely and exactly filled the space above the larynx, keeping the epiglottis in a horizontal position covering over the rima glottidis." A committee of the Society was appointed to examine the specimen minutely, and the report which they furnish, after giving a detailed account of the tumour, concludes with these words:—"The opinion at which we arrive is, that the tumour is mainly, if not entirely, the result of hypertrophy or excessive development of the racemose glandular structures normally existing on the surface of that part of the tongue in relation with which the tumour was found."

Such a case as this is very rare; but when it does occur, if the tumour can be clearly seen, and its attachment ascertained, it might perhaps be removed with the éraseur; though there can be no doubt that such an operation would be attended with much difficulty, on account of the extreme youth of the patient. It might, however, be attempted, as affording the only chance of saving the child's life.

CHAPTER IV.

ATROPHY OF THE TONGUE.

THE size of the tongue varies so much in different individuals—nay, it even varies so much in the same individual at different times according to the state of his general health, that it is not easy to note slight degrees of atrophy. Yet a true atrophy of the muscular substance of the organ usually accompanies those forms of paralysis that affect the nerves supplying the tongue. These conditions are so interesting and important that I shall briefly allude to them, though they are, in truth, not so much diseases of the tongue, as diseases of the nervous system manifesting themselves in this organ among other parts.

In hemiplegia one half of the tongue is paralysed, but the degree in which this organ is affected is usually comparatively slight, and, when recovery takes place, it is one of the first parts in which an amendment is apparent. But if the paralysis is considerable, and persists for a length of time, the muscular fibres become wasted from disease; they acquire a pale yellow colour, the transverse markings become indistinct, and the amount of adipose tissue is increased. Indeed, to such a degree does the deposit of fat take place, that, however much the muscular structure may be wasted, the bulk of the organ undergoes no appreciable diminution.

This hemiplegic paralysis is in striking contrast with other groups of cases in which the loss of power is accompanied by well-marked wasting, and a visible decrease in the size of the affected part. These groups of cases are, (1) those in which there is disease of the medulla oblongata, involving the hypo-glossal nucleus, and, (2) those in which the ninth nerve is diseased, or injured, between the cerebrum and the muscles to which it is distributed.

The cases which fall under the first head may depend upon softening, hæmorrhage, syphilitic disease, or various other causes. This class includes the labio-glosso-laryngeal paralysis of Duchenne. Those which come under the second head are generally due to morbid growths of various kinds, or to accidents or injuries.

In the cases which belong to the first class, the paralysis and atrophy sometimes affect both halves of the tongue; sometimes they are limited to one. But whether one or both sides are involved, it is very seldom that the lesion is confined to the hypo-glossal nerve. Generally the branches of the fifth and eighth pairs, as well as the facial, are more or less implicated. Thus the lips, the soft palate, the vocal cords, and other parts suffer in common with the tongue. That is to say, the functions of several of the most important factors in deglutition, articulation, and vocalization are impaired or destroyed. In the second class of cases it more frequently happens that the lesion is unilateral.

A few instances of the various forms of paralysis with atrophy which fall under these two groups, and in which the state of the tongue has been particularly noted, may be

interesting to my readers, and may serve to illustrate the subject.

(1). Cruveilhier has related the case of a patient who was suffering from progressive muscular atrophy, and in whom the tongue was affected along with the rest of his muscular system. The power of swallowing was so far lost that he had to be fed by means of a spoon put far back in his mouth—*i.e.*, within the grasp of the pharyngeal muscles. After death it was found that the tongue was changed into a fatty mass, in the midst of which were a few vertical muscular fibres. ("Arch. Gén. de Méd.," 5th series, i. 571.)

Mr. Edgar Barker brought before the Medical and Surgical Society a well-marked case of a similar kind, in which the atrophy was first noticed in the muscles of deglutition and speech. Gradually it extended to those of the upper extremity, then to those of the lower, and finally to the intercostals and muscles of the trunk. At the end of two years and a half from the commencement of the disease the patient died. At the post-mortem examination it was found that the whole extent of the tongue had become converted into a soft, pale yellow mass of fatty tissue; the papillæ were shrunk, and the muscular fibres replaced by oil-globules, amidst which granular matter and fat-laden fibres were here and there visible. The genio-hyo-glossi and the stylo-glossi alone retained some of their original structure. The same granular and fatty degeneration of muscle was found in many other parts of the body. A careful search failed to detect any alteration in the peripheral nerves or in the nerve centres. ("Med. Chir. Pro.," June 11, 1864.)

The minute changes which the muscular substance undergoes in progressive muscular atrophy have been described by Dr. Meryon in the "Transactions of the Medical and Chirurgical Society," vols. xxxv. and xlix. Though in many of these cases the deterioration of nerve structure may be so subtle as to escape our comparatively coarse methods of examination, there can be no doubt that they depend essentially upon degeneration of the brain or spinal cord. In some instances the researches of Dr. Lockhart Clarke and others have demonstrated that this is the fact, and it is reasonable to conclude that it occurs also in other cases, attended by similar phenomena, though we are unable to detect the morbid changes.

Dr. Duchenne of Boulogne narrates an example of "atrophic musculaire graisseuse progressive générale" in which the tongue was so obviously shrunken and diminished in size that it had lost "at least three-fourths of its volume." ("Electrisation Localisée," obs. 107.) It was in a constant state of tremulation. Faradization only produced contractions in a few places, and speech was slow.

Dr. Hughlings Jackson has lately reported in the "Lancet" (Nov. 30, 1872) a case in which both sides of the tongue were totally paralysed and atrophied. The patient had long been under his observation, and the post-mortem examination was made by Dr. Lockhart Clarke. The disease in this instance was found to depend upon minute hæmorrhages in the medulla oblongata. Dr. Jackson has also recorded a case, which he believed to be due to the same cause, but in which the paralysis and wasting were confined to the right side of the tongue. There was also

paralysis of the right side of the palate and of the right voeal eord. (“*Lond. Hosp. Reps.*,” i. 361.)

Dr. Buzzard has recently given the history of a case in which the right half of the tongue was remarkably wasted, with unilateral atrophy of the face on the same side. The cause of this affection was obscure, but it dated from an attack of chorea; and Dr. Buzzard conjectures that both the chorea and the unilateral atrophy may have been due to the same cause, and that “embolism of the vascular supply of a nerve centre may have been the first step by which the influence of trophic nerves upon the affected tissues was interrupted, and the series of changes inaugurated.” (“*Clin. Soc. Trans.*,” v.)

These examples may suffice to illustrate the first group of cases of atrophy of the tongue—bilateral or unilateral wasting depending upon diseases of the brain. It is not necessary that I should dwell on the subject at greater length, more especially as the cases included under this head do not usually come under the care of the surgeon.

(2). Romberg has related a remarkable case of paralysis and atrophy of the tongue, which he believed to be due to compression of both hypo-glossal nerves at their point of insertion. “A widow of sixty-nine had suffered from violent lancinating pains at the occiput and back of the neck. These were followed by difficulty of speech and deglutition. When she came for advice in 1842, her speech was thick, indistinct, and difficult to understand, whether she whispered or spoke loud; the saliva ran from the over-filled cavity of the mouth; the genio-glossi were paralysed, and it was with extreme difficulty that the

patient protruded her tongue, which she had scarcely done when it was instantly drawn back by the stylo-glossi.

“The lateral movements were less impeded. The tongue was much atrophied, and had lost its smooth uniform appearance; its surface was covered with deep furrows, and raised into folds, which were constantly oscillating.

“The patient stated that her sense of touch and taste was more obtuse than formerly; but she felt the pricks of a pin distinctly, and when powdered colocynt was strewn upon the root of her tongue, she tasted it rapidly and distinctly. The temperature of the tongue was normal, and it was constantly covered with a thin, white, moist fur. Deep pressure under the angle of the jaw, upon the upper cervical vertebræ, and the lateral muscles of the neck, caused pain. The motility of the head, the extremities, and the respiratory muscles, was in no way affected. There was no trace of external injury, or of any constitutional disease. Issues applied to the nape of the neck produced no effect. During the succeeding years this patient was often presented to the clinical students. All the muscles of the tongue were seized with paralysis, so that the tongue lay in the cavity of the mouth like a block of wood; the front teeth of the lower jaw left indentations upon the fore part of the tongue. The atrophy, and division into separate fasciculi, increased, and the oscillation of the muscular fibres was augmented in proportion. The power of speech has entirely ceased; mere inarticulate notes can be heard, which the patient's daughter has learnt to understand by practice; deglutition has ceased; the patient is obliged by dint of her fingers to push the soft

morsel over the dorsum of the tongue into the pharynx, and to bend the head backwards when she drinks. It is manifest that the vagus has now become involved, and by day and at night there are suffocative attacks of respiration, with a whistling sound. The muscles of the neck, especially the sterno-cleido-mastoid and the trapezius, lose their energy, and an oscillation is seen in their fasciculi. The head can no longer be maintained in the upright position, or be sent backwards, but at once falls forwards; on the other hand, the motility of the extremities, and the integrity of the intellect, continue unimpaired. The emaciation has reached an extreme point, and death from starvation is unavoidable." (*"Nervous Diseases,"* Syd. Soc. Translation, ii. 307.)

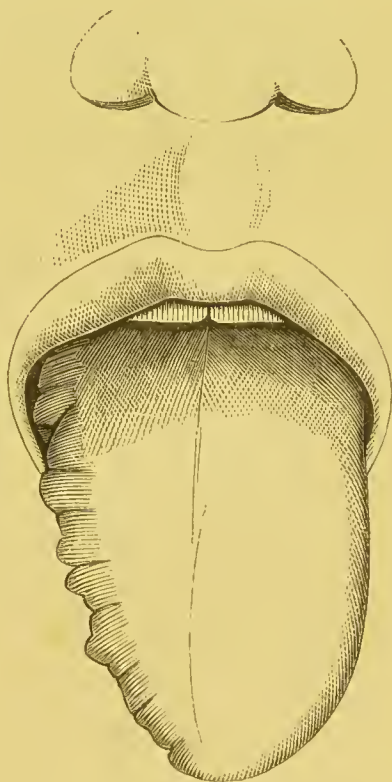


FIG. 17.—Unilateral atrophy.

When the lesion is external to the brain, between the giving off of the nerves and their distribution, it more frequently happens that the paralysis and atrophy is confined to one side. Fig. 17 represents the only case of this description which has come under my own observation. The details of it will be found in the fifty-fifth volume of the "*Medico-Chirurgical Transactions.*" Examples

of a somewhat similar kind have been put upon record by other observers. It may be interesting to my readers if I give a brief account of some of them, for, though they all depended upon disease or injury of the hypo-glossal nerve, the causes of such disease or injury were very various.

Baron Dupuytren has related a case at considerable length in which the symptoms were well-marked, and where, after death, a number of hydatids were found at the base of the cerebellum, one of which had introduced itself into the anterior condyloid foramen, and compressed in the most evident manner the hypo-glossal nerve. ("Leçons Orales," i. 493, and iii. 361.) Sir James Paget has narrated an example in which a young man fell heavily on the back of his head. Ten months afterwards an abscess formed and discharged. Subsequently when he protruded his tongue he noticed that it deviated to the right side. When he came under surgical treatment it was observed that the right half of his tongue was exceedingly wasted, and less than half the size of the other. It was collapsed, wrinkled, and sunken, and the muscles of the left side alone appeared to act. Its sensations were unimpaired. Sir James Paget removed some considerable portions of dead bone from the lower and back part of the skull. The patient made an excellent recovery, and six months later only a slight difference was perceptible between the two halves of the tongue. In this case Sir James Paget says:—"The wasting was so rapid, that it may be ascribed to some morbid condition of the hypo-glossal nerve, or of filaments enclosed in it, and as rapidly recovered from when the morbid condition was brought to

an end by the removal of the dead bone." ("Clin. Soc. Trans.," iii.) Mr. Holthouse has related a case of "Paralysis of the sixth and ninth cerebral nerves of the left side, of syphilitic origin, producing inversion of the left eye and wasting of the left half of the tongue." The patient was a compositor, aged thirty. Passing over the other particulars of his case, we may quote what Mr. Holthouse says of the affection of the hypo-glossal nerve: "On putting out his tongue the point deviates to the left side, and, what is remarkable, its two halves do not correspond, the left half being broad, flat, and thin—in fact, atrophied—whilst the right is plump, firm, and roundish. He complains of his food getting under his tongue and between the gums and cheek on the left side, and he cannot remove it with the tongue, but is obliged to use his finger for that purpose. On the other side this inconvenience does not exist. Sensation and taste are not affected, nor is his speech." In this instance a mercurial course was prescribed, and some amendment took place. The patient was seen after the lapse of six years, and then it is added:—"On putting out his tongue, its point is still directed to the left side, but this deviation seems to be partly owing to the features inclining to the right side (a congenital malformation, and not due to paralysis). The difference which formerly existed between the two sides of the tongue is now scarcely apparent, the left half having lost its flatness and become plump and round like the opposite. ("On Squinting," i.) Dr. Hyde Salter recorded a case which occurred in the practice of Dr. William Budd. A man was stabbed in the neck, the wound dividing the external carotid artery and the hypo-

glossal nerve on the left side. The artery was secured, and the patient recovered with palsy of the left side of the tongue. At the end of some weeks that half of the tongue was much wasted, and all the movements of the organ were performed by the other. The atrophy was confined to the muscular element; taste and touch remained unimpaired. This case, it will be observed, differs from the preceding ones, in that the vascular supply was disturbed as well as the nervous. ("En cyc. of Anat. and Phys.," art. Tongue.)

In the case which came under my own observation, the right half of the tongue was much shrivelled and collapsed. The contrast which it presented to the other side was very remarkable. In this instance there can be no doubt that the right hypo-glossal nerve had suffered some severe injury; indeed it seemed highly probable, from the history of the patient, that it was involved in a secondary cancerous tumour. A parallel case has been recorded by Dr. Habershon, in which the diagnosis was confirmed by an autopsy. A woman applied at Guy's Hospital on account of a tumour in her right breast. Mr. Birkett pronounced it to be malignant, and she was advised to have it removed; but this she declined. Subsequently it became evident that there were secondary growths in the spine and at the base of the skull. When told to protrude her tongue, it deviated to the right side, and that half of the organ was remarkably wasted and flaccid. After death a mass of cancer was found in the basilar process, extending on the right side into the temporal bone, and involving the eighth and ninth nerves. The muscles supplied by the hypo-glossal were of a yellowish colour and obviously

wasted. On microscopical examination it was found that the fibres had entirely lost their striated appearance, and that large numbers of fat globules were interspersed between them. Some of them were transparent for a portion of their length, and showed a tendency to split into discs. ("Medical Times," Feb. 9th, 1867.)

When one side of the tongue is paralysed, either from central or from intermediate disease, the general rule is that, when it is protruded, it deviates to the affected side. The healthy muscles push the tip in the opposite direction. But this general rule admits of exceptions. If the patient's attention is directed to the subject, he can use the muscles of the sound side, particularly the stylo-glossus, so as to put the tongue out straight, or even to carry it towards the healthy side. A case of this kind is mentioned by Dr. Carpenter, in which the hypo-glossal nerve was divided on one side, but the patient could put out his tongue to either side, as he was desired. ("Physiology," sixth edition, 518.)

In paralysis of the *portio dura* the chorda tympani is affected, and through it the movements of the lingualis muscle are impaired. This makes itself felt throughout the whole organ, and thus facial paralysis produces also some degree of paralysis of the tongue.

Before I leave this subject, it may be well to say a few words about neuralgia as it affects the tongue.

Neuralgia in this organ is not a common complaint, but it is attended by excessive pain, and this pain is aggravated by the slightest movement, so that the patient's sufferings are extreme. As a rule it only affects one side. Some-

times it is strictly localized and confined to the nerves of the tongue ; in other cases it extends to other parts, as the jaw, the ear, or the temple. In some instances it is evidently reflected from disease of a neighbouring part, as from caries of a tooth ; in other instances it stands alone, and the surgeon can trace no connection between it and any appreciable morbid state of the adjoining structures. In some cases it depends, no doubt, upon weakness, or upon derangement of the stomach, and this will be the more likely if, as frequently happens, the attack is attended by headache, constipation, a coated tongue, and fœtid breath.

With respect to the treatment of this painful complaint, our first inquiry must be as to its cause. If any local disease can be found, it must be removed. If none is discoverable, we must address our remedies to the general health or to the digestive functions ; and a purgative or an alterative, as the case may require, followed by tonics—steel, quinine, arsenic, or strychnia—will generally suffice to remove the evil. In a severe case related by Dr. Neffe, a cure was effected by faradization. (*"Gazette Méd. de Paris,"* July 29th, 1865.) Vanzetti has given an account of a case in which he excised a portion of the lingual nerve with complete success.

Spasm of the tongue is enumerated by Romberg among the nervous diseases to which this organ is liable ; but he says that it is an extremely rare affection, and in the few examples that he saw, it was associated with hysteria, neuralgia, or meningitis. (*"Nervous Diseases,"* Syd. Soc. Translation, i. 314.)

CHAPTER V.

HYPERTROPHY OF THE TONGUE.

Hypertrophy of the tongue (*macro-glossia*, *prolapsus linguæ*, *lingua propendula*) is a disease which is generally, though not always, congenital. The infant is born with a tongue that is too large for its mouth, and hangs out like the tongue of a recently-slaughtered calf. Hence the disease used sometimes to be called *lingua vituli*. The organ is well formed, and at first is natural in appearance, only it is larger than it should be. The enlargement may be symmetrical, or it may affect one side more than the other. It does not prevent the child from breathing or sucking, but the little patient seems to feel discomfort from its size and from its constant protrusion. Occasionally the enlargement has increased in a backward direction, so as to render breathing difficult, and in some very exceptional cases it has thus produced suffocation.

In the instances in which this affection is not congenital, it usually comes on gradually within the first two or three years after birth. In almost all the examples with which I am acquainted, it has manifested itself in early life. Where the hypertrophy has come on after birth, it has generally followed some severe illness, as an epileptic fit, or a fever; or some local disease, as an abscess, or a ranula, and has been attributed to that cause. In not a few instances it has been due to mercurial salivation.

Happily, cases of prolapsus linguæ are rare. Only one example has come under my care, the particulars of which I shall relate presently. But first let us inquire what is known of this disease, and what has been the experience of the past in respect to it.

The disease has been noted by medical writers from a very early period. It is mentioned by Celsus and Galen, and cases have been related by many authors since their time. During the present century several essays have been written on the subject. The earliest of these treatises was by Lassus, and to it I am much indebted.

At first, as I have said, the enlarged tongue has a normal appearance. It looks, in fact, much like the tongue of an adult protruding from the mouth of an infant. Gradually from exposure to the air and constant stimulation the mucous membrane becomes somewhat dry, thickened, and callous, or covered with a slimy secretion, while the papillæ become a little larger and more prominent than natural. This state of things goes on steadily increasing until the period of dentition arrives. When the teeth begin to come—and, be it remembered, it is the lower incisors which first make their appearance—the tongue, by constantly pressing upon them, becomes ulcerated and extremely painful. Moreover, the pressure of the teeth acts as a line of constriction, and the portion of the organ beyond them rapidly enlarges from mechanical congestion. The surface of the tongue becomes bluish or brown; the mucous membrane roughened and cracked; there is a tendency to ulceration and hæmorrhage; the muscles become palsied and are unable to retract the

organ. But this is not all. As time goes on, the lower jaw is pressed down by the superincumbent weight, and occasionally this goes so far as to produce dislocation. ("Path. Soc. Trans.," vols. vi. and viii.) The teeth project forwards, the lips are everted, and there is a constant flow of saliva from the open mouth. Altogether the patient's appearance is most unsightly, and his condition very distressing, for with such a tongue mastication and deglutition are difficult, and speech is thick and indistinct.

M. Lassus is of opinion that much may be done for these cases by strapping and bandaging, combined with the use of strong astringent lotions, and he lays great stress upon the value of this method of treatment.

If there is not much depression of the lower jaw, if the tongue is only slightly hypertrophied, or if it can be reduced to such a size as makes it possible to return it within the mouth, it can be retained there by means of a bandage passing under the chin and tied over the crown of the head. In this simple way much benefit may be obtained, and sometimes a cure may be effected. Lassus mentions a case in which the tongue of an infant, eight days old, protruded a finger-breadth, and was cured by being retained within the mouth by means of such a bandage. Other examples are on record in which even a greater degree of protrusion has been remedied in older children by the same means. The good results which can be obtained by bandaging are shown by the following case of Dr. Clanny's. The patient was a boy, aged five, and the tongue protruded to the extent of three inches.

After relating the appearances of the disease, Dr.

Clanny says :—" I ordered the tongue to be returned into the mouth and retained there by means of a silk handkerchief, which was passed below the chin, and the ends firmly fastened at the crown of the head. By this means the jaws were kept perfectly close together. At first the child appeared very uneasy, but being relieved occasionally by taking off the handkerchief for a few minutes, and replacing it again, he was enabled to bear it ; and, in the course of five weeks, the tongue became of the natural size and appearance, and he could pronounce several short words very distinctly. By these means a perfect cure was effected. (" *Edin. Med. and Surg. Jour.*," vol. i. 1805.)

In another case which is related by Lassus great benefit was derived from enclosing the tongue in a bag which was drawn backwards towards the mouth by a kind of bridle fastened behind the head. The bag was occasionally removed in order to feed the patient, and from time to time he was allowed to rinse his mouth with wine.

The thirty-sixth volume of the Transactions of the Medical and Chirurgical Society contains three papers upon hypertrophy and prolapse of the tongue—the first by Professor Humphry of Cambridge, the second by Mr. Hodgson, and the third by the late Mr. Teale. Professor Humphry enters into the subject at some length, and gives a list of the authors who have referred to the disease. If any of my readers are anxious to form an idea of the frightful deformity and inconvenience to which a neglected prolapsus linguæ is almost certain to give rise, I cannot do better than refer them to the illustrations which accompany this essay, and which were taken from the girl upon whose

ease the remarks are founded. This paper seems to have called forth the brief narratives in which Mr. Hodgson and Mr. Teale give their experience of the disease.

In the following table I have entered all the cases of prolapsus linguæ that I have been able to find on record, which were submitted to active treatment; and from it the reader will gather what has been the experience of the past as regards the various methods of dealing with the disease. Other cases which have been noted, but in which no treatment was adopted, I have not included in my list; for my object has been to weigh the merits of the different modes of treatment, and to arrive at a practical conclusion.

From a consideration of this table, it appears that the disease is most common in the female sex; that, if it be not congenital, it almost always commences during the earliest years of life; and that, when the hypertrophy is only slight, or when the patient is of an age to assist the surgeon in carrying out his remedial measures, great benefit may be expected from regular compression combined with the use of emollient or astringent lotions. Whether the compression is applied directly to the tongue, or mediately by returning the organ into the mouth, and supporting the lower jaw with a bandage, must depend upon the circumstances and the severity of the case. If the former method is used, the best plan is to apply a piece of lint dipped in a strong astringent lotion round the protruded tongue, and over this to wind a tape or strips of adhesive plaster. The best applications to use are alum, sulphate of copper, or tannin. But whatever is used, and however it is

Table of Cases of Hypertrophy of the Tongue, in which Active Treatment was Adopted.

Surgeon.	Sex of patients.	Age at which disease began.	Age at which it was treated.	Method adopted.	Result.
Le Blanc . .	F.	3 years.	17 years.	Compression	Cured.
Hoffman . .	F.	Birth.	10	Amputation	Cured.
Louis . . .	F.	"	40	Ditto, with lettuce lotion . .	Cured.
Percy . . .	M.	"	16	Amputation	Cured.
Siebold . .	F.	"	10	Ligature	Operation succeeded; died of fever.
Klein . . .	M.	"	9	Amputation	Cured.
Lassus . . .	—	"	8 days.	Compression and alum powder	Cured.
Lassus . . .	M.	2½ years.	6 years.	Compression and leeches . .	Cured.
Clanny . . .	M.	1	5	Compression	Cured.
Rutorrf. . .	F.	Birth.	3	Amputation	Cured.
Bjerkin . .	F.	2 years.	12	Ligature	Cured.
Mirault. . .	M.	Birth.	34	Ligature	Cured.
Fine	F.	1 year.	6	Ligature	Cured.
Freteau . .	F.	24	24	Compression	Cured; probably mercurial.
Neumann . .	M.	Birth.	5	Amputation	Cured.
Harris . . .	M.	"	19	Amputation	Cured.
Harris . . .	—	4 years.	24	Ligature and amputation . .	Cured.
Delpech . .	F.	21	26	Compression	Cured.
Wells . . .	F.	1½	6	Ligature and amputation . .	Cured.
Mussey . . .	M.	Birth.	13	Amputation	Cured.
Nevermann .	M.	"	8	Amputation	Cured.

Edhold.	—	—	—	Ligature	Cured.
Löber . . .	F.	Birth.	10	Amputation	Cured.
Federici . .	M.	"	—	Amputation	Cured.
Leuw . . .	F.	"	21	Amputation	Cured.
Ruhbaum . .	F.	5½ years.	6	Compression	Cured.
Pimpernel . .	M.	Adult.	—	Amputation	Cured; originated in mercurial glossitis.
Astley Cooper	F.	—	18	Ligature	Cured.
Liston . . .	M.	Birth.	19	Ligature of lingual arteries and of tumour.	Died.
Crosse . . .	F.	"	6	Compression	Cured.
Hodgson . .	F.	"	2	Ligature	Cured.
Teale . . .	F.	1 year.	3	Compression	Cured.
Syme . . .	F.	Birth.	12	V-shaped excision and compression	Died of laryngitis.
Syme . . .	M.	"	15	Compression, and removal with scissors.	Cured.
Syme . . .	M.	3 years.	7	Ditto ditto.	Cured.
Maas . . .	M.	—	2 months.	Galvano-cautery	Cured.
Humphry . .	F.	2½ years.	11 years.	Amputation	Cured.
Sédillot . .	—	5	9	V-shaped excision.	Cured.
Gross . . .	M.	Birth.	6	Compression and pyroligneous acid lotion.	" Materially benefited."
Paget . . .	F.	1½ years.	3	Écraseur and scissors.	Cured.
Fergusson . .	F.	Birth.	7	Ligature	Cured.
Simon . . .	M.	"	14 months.	Écraseur	Died of pneumonia.
The Author . .	M.	"	5½ months.	Écraseur	Cured.

applied, it will probably tax the surgeon's ingenuity to keep the bandage in its place.

If the case is suitable for indirect pressure, the best method is to have a calico or flannel bandage with a hole cut to receive the chin, and two or three tapes to secure it upon the vertex. If the patient can bear it, an elastic bandage may be substituted for the flannel one—indeed, there are various ways in which the principle may be carried out. Whatever compressing bandage is used, it should be removed frequently, especially at first, to allow the patient to take food, as well as to rinse his mouth with an emollient, astringent, or refreshing wash.

In recent cases, such as those which follow mercurial salivation, benefit may be obtained by applying leeches to the tongue, or scarifying it, before compression is begun.

But if the prolapse is large, or if it has lasted for some years, it will generally be found that, after milder measures have had a full trial, there will still remain an inconvenient and unsightly amount of protrusion; for the complaint is not one which shows any tendency to a spontaneous cure. On the contrary, if it is allowed to continue, it will get worse, and become a source of the greatest annoyance and discomfort to the patient. One case is mentioned by several writers, of a young lady at Leyden, who was attacked by the disease after a severe fever, at the age of fifteen. The prolapse increased to such an extent that the tongue protruded from the mouth four and a half inches. In order to conceal it she had a silver shield made. This she wore all her life, and she lived to the age of eighty.

When it becomes necessary for the surgeon to proceed

to severer measures, the question arises, What course ought to be adopted? As the hypertrophied tongue is chiefly supplied by vessels which are not difficult to reach, it has been proposed that ligatures should be placed upon the lingual arteries.

It was upon this principle that Mr. Liston acted in dealing with a remarkable case which he has related in his "Elements of Surgery." In this instance, though the disease was congenital, nothing was done till the patient reached the age of nineteen, when he was brought to that distinguished surgeon. At this time the tongue protruded three or four inches from the lips, and entirely filled the cavity of the mouth. Both lingual arteries were tied, and subsequently a ligature was placed round a portion of the tongue, which began to slough. "At that time the patient complained of no pain, and felt very comfortable. But his system soon afterwards became much disordered; abscesses formed rapidly over both wrists and on the hands, unhealthy infiltration of the cellular tissue took place at the root of the tongue, and amongst the deep muscles at the upper part of the neck, the parts became gangrenous, and he died." ("Elements," p. 410.) In this case the enlargement of the arteries was so great that the disease had reached a kind of nævoid development. Probably this takes place after a certain time in most cases which are allowed to run their natural course.

As the tongue is supplied from other sources besides the lingual, no benefit is likely to arise from treating prolapsus by ligature of the arteries. It is probable that when one channel is obstructed others rapidly enlarge, and thus

the hypertrophied tissues obtain the nutrient fluid they require.

As ligature of the lingual arteries is unadvisable, the surgeon may entertain the idea of taking away the protruded portion by any of those means which are used for removing tumours—namely, the knife, the ligature, the éraseur, or the galvano-cautery.

In 1695 an aggravated case was brought before the Society of Medicine at Stockholm. The patient was a girl, ten years of age. Her tongue protruded four inches from her mouth, and was two inches in thickness. Her condition was miserable, and it was decided that the protruding portion should be cut off. Hoffman, a surgeon of Stockholm, undertook the operation, and the manner in which it was performed does not give one a very high idea of Swedish surgery one hundred and eighty years ago. The tongue was fixed on a kind of broad hollow spatula, and the protuberant extremity of the organ was cut off with a chisel very much like that which is used by sculptors and stonemasons. The hæmorrhage was arrested by the actual cautery. It is said that the girl was perfectly cured in about three weeks, and that she could afterwards swallow with ease and speak freely.

At the present day, if the surgeon determines to use the knife, he may devise something better than this. In one case Mr. Syme removed a V-shaped portion of the tongue, and the immediate effect was to bring the organ within the mouth; but it enlarged again so rapidly, that in the next case which came before him he determined to try pressure before he resorted to the use of the knife, and in this instance the result was perfectly satisfactory.

In a case related by Sir William Fergusson, as well as in many other cases embodied in the foregoing table, the protruded portion was removed by ligatures, and a good result was ultimately obtained. ("Practical Surgery," 5th ed. 518.)

In my own case I used the *écraseur*, and the same instrument has been employed by others.

The galvano-cautery has also been used. Dr. Maas of Breslau relates ("Archiv für Klin. Chir.," Band xiii. Heft 3) a very interesting case of hypertrophy of the left side of the tongue, associated with an over-development of the whole of the left side of the body. The patient was a male child, two months old. The tongue protruded four-fifths of an inch beyond the lips. It was removed with the galvano-cautery, and the child made a good recovery.

In most of the cases that have been actively treated the patient had attained some years of age before an operation was undertaken, yet in almost all these examples the disease had been congenital or had commenced in very early life. But why should the patient be allowed to go thus long unrelieved? more particularly as it is admitted by all that when the teeth begin to come the disease is mechanically aggravated, and that, as the development of the lower jaw goes on, it is pressed downwards by the weight of the hypertrophied tongue. It was the consideration of these points which led me to undertake a very early operation in the case which I am now about to relate.

Herbert I., born August 16th, 1871, was brought to me at Charing Cross Hospital on the 12th of the following

December. At birth it was noticed that his tongue hung down to his chin. About the third day it decreased to its present size, probably by the subsidence of œdema, which had been produced during the confinement. The hypertrophy affected the left half more than the right. The portion of the tongue which habitually protruded measured fully an inch and a quarter in length, and the same in breadth, by three-quarters of an inch in thickness (Fig. 18).

The surface of the tongue differed little, if at all, from its natural appearance. It completely filled the aperture of the mouth, and the patient breathed almost entirely by his nose. This had the effect of sharpening his features, and so making him look older than he was. He was a fine child, intelligent and good-humoured, though every now and then he seemed to get into a passion with his tongue, because it impeded his respiration. He found no difficulty in sucking—indeed, here his large tongue helped him, for he protruded it to the full extent along the under surface of the breast, and worked it vigorously as he drew the milk. No tumour or enlargement of any kind was to be seen at the back or floor of the mouth. The appearance of all these parts was perfectly natural. The heart-sounds were normal, and the general health excellent.

Under these circumstances I advised that both the mother and her infant should come into the hospital, with a view to an operation upon the child's tongue. Before, however, I undertook a proceeding which was necessarily attended with some danger, repeated attempts were made to bandage the tongue with strips of isinglass plaster, in the manner recommended by Lassus. But this was found



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Hypertrophy of the Tongue (Protrusion of the Tongue)

Fig 18.

quite impracticable in consequence of the moisture and mobility of the organ. In an older child, or where the mucous membrane had become dry and roughened, strapping might perhaps have been effected; but with a mucous surface which was normally moist and smooth, and in a patient who was too young to give the least assistance, I found continued compression quite impossible. As the infant was already beginning to show symptoms of dentition, it was desirable to do something for his relief without delay, and I had to consider what operation was most suitable to a patient of such tender age. As no success had attended the ligature of the lingual arteries, and as in almost all the cases with which I was acquainted a part of the tongue had at last required removal, I determined to take away the whole of the protruding portion by means of the *éraseur*. Accordingly this was done, under the influence of chloroform, on January 27th, 1872. The point of the tongue was drawn through the loop of the instrument, two long needles were passed vertically through the organ at the line of desired section, the screw was tightened, and the whole of the protruding portion was taken away. The *éraseur* used was fitted with a single wire, and the section was completed in about two minutes. Some sharp bleeding followed, and three vessels had to be secured by ligatures. But before this could be done the child had lost a good deal of blood. The sides of the stump were brought together by sutures passed deeply through the substance of the tongue, and small fragments of ice were constantly placed in the child's mouth for the next few hours. No further bleeding took place.

It is not necessary that I should transcribe the notes of the case from day to day. Suffice it to say that, on the whole, the child progressed almost as favourably as possible. For the first few days the tongue was much swollen, and on February 2nd, in a fit of coughing, the stitches gave way. The stump presented an irregular wound, about the size of a shilling, but the surface had a healthy aspect. As the patient looked pallid, fifteen drops of brandy were given *per diem* with marked benefit. The principal difficulty experienced was in feeding the child. He was unable to draw the breast and could not use a bottle. He had therefore to be fed with a spoon, and it was some time before his digestion accommodated itself to the change of diet. The swelling of the tongue gradually subsided, and the wound contracted. On the 13th of February, as the mother was anxious to return home, she was discharged, with directions to bring the child to the hospital once a week as an out-patient. At this date the wound was quite healed, and the cicatrix not much larger than a sixpence. The tongue, which was gradually assuming a rounded shape, did not protrude beyond the arch of the jaw, and the mouth was almost shut, particularly during sleep. It was fully explained to the mother that great benefit would arise from gently closing the jaws, so as to exercise a slight pressure upon the tongue within the mouth.

On February 20th, the child was brought as an out-patient. He was looking very well, having quite regained his colour. The cicatrix was contracted to the size of a fourpenny piece. The tongue did not protrude beyond the jaws, and the mouth was nearly closed. An ordinary

observer would merely have said that the child had a thick tongue and rather an open mouth.

On March 5th the child looked remarkably well. The tongue was quite within the arch of the jaw, and showed no tendency to protrude. It had become much more rounded and shapely than when it was last seen, and the cicatrix was marked only by a slight notch in the centre. After this I saw him from time to time, and his progress was all that I could desire. On the 6th of August I noted that the two lower incisor teeth had come, and that they were growing properly. His mother said that he was beginning to talk.

On microscopical examination the papillæ, as well as the mucous and submucous tissues, were found to be somewhat enlarged and thickened, and the bundles of muscular fibre were slightly coarser than natural. But on the whole the appearances differed very little from those of the healthy tongue. The morbid anatomy of Mr. Simon's case, which is classified in the foregoing table, has been beautifully delineated by Mr. Henry Arnott in the last volume of the "*Pathological Society's Transactions*." (1872.) Dr. Maas has observed in some of these cases great dilatation of the lymphatics, as well as of the blood-vessels. ("*Brit. Med. Jour.*" Dec. 18, 1869.)

An occasional protrusion of the tongue is a common practice among infants generally, and one can easily believe that the motion and moisture are soothing to the gums when heated by the irritation of teething. We cannot be surprised, therefore, that tongue-sucking should sometimes grow into a habit, and lead to constant protrusion, resulting

in an alteration of the texture of the organ, and depression, or even dislocation, of the lower jaw. ("Brit. Med. Jour.," Aug. 31, 1872.) This bad habit seems particularly apt to arise in children who are more or less idiotic. Our idiot asylums could furnish many examples of this form of disease. Mr. George Lawson has lately reported to the Clinical Society a case of *prolapsus linguæ* in a half-idiotic girl, aged fifteen months. (Trans. iv.) I have myself seen several cases of tongue-sucking, and in every instance the patients were deficient in mental development.

In respect to treatment, cases such as these are not very promising. An operation is almost out of the question. Compression may be tried as far as it is practicable. But if the original fault is mental, it is chiefly by careful training that we can hope to correct it.

CHAPTER VI.

PARASITIC DISEASES OF THE TONGUE.

WHEN we consider that the mouth is the only channel for the ingress of food, as well as the main orifice for respiration, we shall not be surprised to find that various parasites are met with on the surface of the tongue. It is easy to understand how the spores of minute fungi can obtain admission to the mouth, indeed they must be drawn in with almost every breath. When the secretions are in a normal condition, their vitality is at once destroyed. When, however, the saliva is in a state which is favourable to their development, the warmth and moisture afford just such nidus as they require.

In some states of debility and deranged digestion the tongue, together with the other internal parts of the mouth, becomes studded with small flakes, like morsels of curd, which are known as *aphthæ*, and constitute what is popularly called "the thrush." Sometimes these flakes extend and coalesce, so as to form large patches of thick, soft, fleecy fur. This disease is particularly apt to manifest itself at the extremes of life—in infancy and old age—but it occurs also in the later stages of many wasting complaints. The white flakes can easily be detached, but, if this is done, they are soon reproduced. It is better, therefore, not to pick them off, but to aim at removing the conditions which are essential to their existence.

If they are forcibly detached, they carry the epithelium with them, and leave the papillæ raw ; and these raw spots are prone to ulcerate. Aphthous ulcers have very characteristic appearances. They are small, flat, and circular or oval. They generally occur in clusters, and, as it were, in successive crops. Their bases are soft and smooth, with a thin yellowish or grayish slough. Their margins are well-defined, and surrounded by a bright red areola, but without thickening or elevation. Their common situation is on the fore part of the tongue, the gums and lips. They are always



FIG. 19.—*Oidium albicans*. $\times 300$.

attended by increased heat, by vivid congestion of the mucous membrane, not merely of the tongue but also of the inside of the mouth and lips, together with active gastric or intestinal irritation, and there is fever of a more or less atonic kind.

It was not till 1842 that the precise nature of these white patches was ascertained. In that year it was shown by Gruby that

they depended upon the presence of a microscopic fungus, to which he gave the name of *aphthaphyte* or *cryptogame du muguet*. Subsequently this fungus was referred by Robin to the genus *oidium*, and by him called *oidium albicans*. ("Hist. Nat. des Vég. Parasit.," 1853.) It

seems probable that it is the immature form of some fungus belonging to another genus, but upon this point there is much obscurity. The *oidium albicans* is found growing upon the surface of the tongue in close association with the epithelium. It forms delicate horizontal filaments, which are apparently homogeneous in structure, and from which short articulated pedicels take their rise. The uppermost cells of these pedicels become expanded into oval bodies, which fall off, germinate, and become new filaments. It is generally found growing in tangled masses, like minute bunches of miseltoe, mixed with the *débris* of scattered spores, cells of the *leptothrix* and epithelial scales; but if separate filaments are followed out, we may obtain such forms as those which are represented in Fig. 19.

Another parasitic growth which is very frequently met with in the vitiated secretions of the mouth, and in other situations, is the *leptothrix buccalis*. It consists of rows of



FIG. 20.—*Leptothrix buccalis*. $\times 300$.

minute, transparent cells, like strings of clear beads, which may be either straight, curved, or branched. But the cellular growth, whatever form it may take, is of the simplest and most elementary kind. It is found spreading itself over the epithelial surface of the mucous membrane and over the teeth. It is frequently associated with the

oidium albicans ; but it does not, like it, give rise to any recognised morbid condition, such as the aphthous ulcer. Fig. 20 shows some of the forms that are most commonly met with. Like the preceding illustration, it was drawn from specimens found in the fur taken from a woman, who was dying of epithelial cancer of the tongue.

The conditions which are favourable to the development of these parasitic growths are debility, disordered digestion, and an acid state of the secretions of the mouth.

When an infant is attacked by the thrush it generally indicates that there is a fault in the way in which it is fed ; and, accordingly, the attention of the medical man should be particularly directed to this subject. If it is being nursed by its mother, it should be confined entirely to the breast, and this should be given only at regular intervals. The mother, too, should be cautioned to be particular with regard to her own diet. If the infant is being brought up by hand, the most careful attention should be paid, not merely to the milk, or artificial food, with which it is supplied, but also to the cleanliness of the vessels in which it is kept, and of the bottles or spoons in which it is given. If, notwithstanding every precaution, artificial feeding does not agree with the child, a wet nurse must be procured. Attention to these primary rules of health sometimes has an almost magical influence in removing the complaint. At the same time the child's bowels should be regulated by a slight aperient, while a little of the mel boracis, or the glycerinum boracis, or a powder composed of borax and sugar, should be laid on the tongue every two or three hours. If, when the child begins to amend, it can

have the benefit of a change of air, this will probably hasten its recovery. If ulcers have formed, they should be dusted with powdered alum, or touched with a strong solution of nitrate of silver, or of sulphate of copper, or with the solid caustics.

When thrush occurs in old people, or as an accompaniment of some wasting disease, it is less easy to destroy the microscopic fungus, and to prevent its reproduction. Still much may be done to regulate the *primæ viæ*, to support the powers of nature, and to arrest the spread of the aphthous patches. For this latter purpose Sir William Jenner recommends a lotion of the sulphite of soda— ʒj to the ʒj of water. It should be applied frequently with a camel's hair brush, or the mouth may be rinsed with it. A weak solution of carbolic acid may be used in the same way; or a solution of sulphurous acid, in the proportion of one part of acid to six of water.

No doubt many ulcers are called aphthous, which are really dyspeptic, and which owe their origin to stomatitis, and irritation of the intestinal canal. The true aphthous ulcer is always accompanied by the growth of the parasitic fungus that I have described, and to such ulcers the term ought to be confined.

In a state of health the dorsum of the tongue and the surfaces of the mouth are covered with bacteria; but they remain inert until some derangement of digestion and assimilation gives rise to the conditions necessary for their reproduction.

The parasites already mentioned are only met with on mucous surfaces, but it occasionally happens that those

whose usual habitat is the skin are seen on the tongue and other internal parts of the mouth.

Thus, Sir James Paget alludes to a case which he believes to have been "ringworm on the tongue." ("Lancet," March 11, 1865.) He has kindly furnished me with the following particulars:—"The patient was a healthy gentleman, and the disease had existed for more than a year. On his tongue there was a bare, purplish-pink patch over nearly half the right side, from the place of the outermost of the papillæ circumvallatæ to within half an inch of the tip; and in width, at the anterior and widest part, from the extreme lateral border to within a quarter of an inch of the median line. This patch was all bare, *i.e.*, it had very thin cuticle and no fur; but it was intersected by two curved lines, and at its posterior boundary there was a white ring. The curved lines were undulating, map-like, looking as if formed of low banks of heaped-up cuticle."

In a recent number of the "Archives Générales de Médecine" (January, 1872) there is a notice of what is termed a "nouvelle affection parasitaire de la langue." M. Maurice Raynaud observed on the tongue of one of his patients a gray plaque, the size of a silver five-franc piece, exactly circumscribed and considerably elevated. The surface was villous and hard, the direction of the filaments looking like a field of corn swept by the wind. On microscopic examination it was found to consist of spores exactly resembling those of the *trichophyton tonsurans*. I have myself seen a case of slate-coloured patches on the tongue and lips, with long villous filaments swept down in the way described by M. Maurice Raynaud, and which, as far as the

appearances presented to the unaided eye are concerned, had the same characters as the case related in the "Archives Générales de Médecine." We must distinguish, however, between such growths as these, which are exceptionally seen on the tongue, and the *oidium albicans* and *leptothrix buccalis*, which have a special preference for the interior of the mouth.

As long as persons are in good health, or even in tolerably good health, they need have no fears as to the development of these fungoid growths. The normal state of the saliva is unfavourable to them, and it is only when the secretions become vitiated and acrid that they begin to develop.

Entozoa of various kinds are occasionally met with in the tongue as in other parts of the human body. Thus, Sir Benjamin Brodie alludes to a case which he believed was an example of an hydatid cyst (*echinococcus hominis*) in the tongue. "I remember seeing a patient," he says, "who had a large elastic tumour, or some fluctuation in the tongue, of considerable size, apparently as big as a nutmeg. It was perceptible chiefly on the lower surface of the organ. The surgeon under whose care the patient was, divided the tongue over the tumour to see what it was, and out came a cyst containing fluid, I suppose an hydatid." ("Collected Works" by Hawkins, iii. 483.) The *cysticercus cellulosæ* is another of the larval cestodes which is sometimes found in the tongue. Billroth has seen one extirpated from this situation, and Mr. Shillitoe reported a similar case to the Pathological Society. (Trans., xiv. 170). Of the næmatodes two species have been found in the tongue—the Guinea

worm, (*dracunculus medinensis*, or *filaria med.*) and the *trichina spiralis*. Davaine mentions two instances in which the former were met with. Of one he gives the following particulars :—A negro boy, twelve or thirteen years of age, a regimental fife-player, entered the hospital of Abou Zabel, in May, 1825. He had a painful swelling on the point of his tongue. The flow of saliva was great, he could take no solid food, and his gums were swollen and bleeding. A careful examination of his mouth led to the discovery of a small fluctuating tumour near the frænum. This was lanceed, and a little sero-pus escaped. During the efforts which he made to expectorate, a portion of a Guinea-worm issued from it, hanging out of the mouth without becoming detached. It was seized, and the entire worm was withdrawn without difficulty. It was four inches long. Eight days of careful regimen and emollient gargles completed the cure. (“*Traité des Entozoaires*,” p. 722.) In the “*London Medical Gazette*” (xvii. 382), Dr. Arthur Farre has given a detailed account of a case he examined, in which almost all the voluntary muscles, including those of the tongue, were infested by the *trichina spiralis*. And an example in which these parasites appear to have given rise to local irritation of the tongue, requiring active treatment, is recorded in the second volume of the “*Pathological Society’s Transactions*.” (p. 138.)

I may conclude this chapter with an amusing extract from the third volume of “*Hutton’s Abstracts of the Philosophical Transactions*.” (1694.) Though the case appears to have been seriously entertained by the Royal Society, we can only regard it as an instance of the credulity of former

days, and a specimen of the impostures of charlatans, from which the more precise study of disease has now well-nigh freed us. It is given in the form of an "extract from a letter from the Rev. Thomas Dent to Sir Edmund King, Kt., M.D., concerning a sort of worms found in the tongue and other parts of the body." "This will in a great measure satisfy you," says Mr. Dent to his physician, "about that distemper in my tongue, for which I have so lately had your advice. The chief cause of those rising tumours fixed on my tongue proceeds from the disease of worms, as you will perceive from the following account. In reading M. de la Cross's Memoirs for the Ingenious, in the month of July 1693, letter the 30th, I found an observation which he has published to the world concerning the cure of this disease of worms by one Sarah Hastings, who was famous in the discovery of them in the face, gums and tongue, and which she managed with such dexterous art in the operation that she took them out of any part affected with a goose-quill. I was hence solicitous to inquire if there were any of the worm doctresses now in being; and hearing of one famous at Leicester, I was resolved to write to her, describing all the symptoms as plain as I could explain them; to which I had a return, that she believed my disease to be worms. And being resolved to try the experiment, I took coach for Leicester, where, being come, my doctress, Mrs. French, no sooner inspected the place, but instantly declared her opinion that the distemper proceeded from worms. The next day she fell upon her operation, which was performed in the presence of two aldermen of the town, Mr. Gibbs, my lord of Derby's chaplain, and several others. When piercing the

part affected with a lancet, she drew some blood, and soon after with a small spatula, and another instrument with which she opened the orifices, she picked out five or six worms at a time. She plainly showed them to the spectators as they came out of the flesh; they were all alive, and moved their heads, and are somewhat less than ordinary maggots. Thus, in less than eight days, she took out of my tongue more than a hundred worms, all nearly of the same size, except two very large ones, which she said were of a cankerous production. She took more than thirty out of my gums, which last operation is her daily practice; persons of good note resorting to her from all parts of the country thereabouts. I was very curious to inquire out what cures she had done of this nature, and I found a very satisfactory account from persons of some quality and note. The cures the woman performs in picking out these worms from all putrefactive ulcers, whether in the faces, noses, gums, or tongues of several persons, prove that such animals are generated in those parts." In this case the worm doctress probably did some good by lancing the tongue. Most likely the disease was a chronic abscess, or a softened gummatous tumour. But the extraction of the worms we can only regard as a trick of legerdemain.

CHAPTER VII.

INFLAMMATION OF THE TONGUE, AND ITS EVENTS.

THE tongue, like other parts of the body, is subject to irritation and inflammation. Indeed, it is an organ which shows irritation in several remarkable ways ; and, when it is affected by inflammation, the disease may present such urgent symptoms, and run such a rapid course, that it behoves us to consider it well, and to be prepared to treat it promptly.

The degree in which the tongue may be irritated or inflamed varies much. (1) Sometimes there is only enough irritation to disturb the natural functions of the mucous membrane, and give rise to the formation of fur : *i.e.*, an excessive development of depraved epithelium. This is the most convenient place to mention this condition, as it is often the first step in a series of morbid changes. (2) In other cases the mucosa may be studded with a crop of vesicles, or be inflamed throughout its whole thickness ; and yet the affection may go no deeper. (3) In other instances again a circumscribed portion of the tongue, or the entire substance of the organ, is inflamed. I shall speak of each of these three groups of disease in order.

(1) If I were to attempt to describe, or even to enumerate, all the morbid conditions which produce irritation of the tongue, I should be carried far beyond the proper limits of my subject. The morbid appearances of the tongue, as

indices of the general health, are a most important subject of investigation, and one which would well repay a closer study than they have yet received. What constitutes the essential differences between the various kinds and tints of fur? Why is it that one person passes through life, and even dies, with a clean tongue, while another is never free from fur? These, and other questions of a similar nature, are most interesting; but I have no intention of entering upon their consideration. All I shall do is to point out some of those sources of irritation which give rise to surgical disease, and which often admit of instrumental treatment.

In some instances the fur upon the tongue is due to a local irritation which comes within the reach of the surgeon. Striking examples of this are afforded by cases in which the excessive growth of epithelium has been confined to one half of the organ, and has disappeared when the source of irritation was traced out and removed. Of this Mr. Hilton has given interesting examples in his "Lectures on the Influence of Mechanical and Physiological Rest;" and he has pointed out the curious fact that unilateral furring is generally associated with a morbid condition of the second division of the fifth nerve on the same side, though we might rather have expected that it would be due to irritation of the third division. I have had frequent opportunities of confirming the accuracy of this observation.

Dr. Hyde Salter has recorded some remarkable instances of the extent to which the filiform papillæ may be hypertrophied, apparently from sympathy with an irritated and congested alimentary tract; and I have myself frequently

been surprised to observe the length and thickness of the fur in cases of long-standing disease of the tongue. I have several times seen it nearly a quarter of an inch long. Occasionally cases have been reported of what the observers have termed "hairs on the tongue." But as a matter of fact, hairs, properly so-called, are never met with in this situation. What appear like hairs are prolongations of the epithelial investment of the filiform papillæ. Sometimes these attain the length of half an inch or more, and their resemblance to hairs is very close, especially as they have not unfrequently a brownish or blackish colour. Specimens of these filamentous processes are given in Figs. 11, 12 (p. 18); and it will be seen that the so-called hairs are composed of the ordinary epithelial cells packed closely together and arranged in an imbricated manner.

The simplest morbid affection of the epithelium is that which is termed *psoriasis linguae*. A circumscribed patch assumes a white, opaque appearance, as if it had been painted with a solution of nitrate of silver. The details of the papillary structure are lost, and the area is merely mapped out with a few delicate ramifying grooves. This appearance is brought about by a slight accumulation of the epithelium, which becomes matted together into a smooth and almost uniform surface. After the lapse of a day or two, it is detached from the subjacent mucosa, and is thrown off either in the form of minute particles, or of larger scales. The exposed mucous membrane then looks raw and of a deep red colour, and the surface is slightly swollen. This complaint is said to occur as a consequence of gastric or local irritation, and to be occa-

sionally seen in conjunction with non-specific scaly diseases of the skin ; but, as far as my own observation goes, it has generally a syphilitic origin, and is seen in association with those obstinate affections of the tongue which are due to the venereal poison. Sometimes it occurs in fugitive patches upon a tongue which presents other syphilitic lesions ; some-

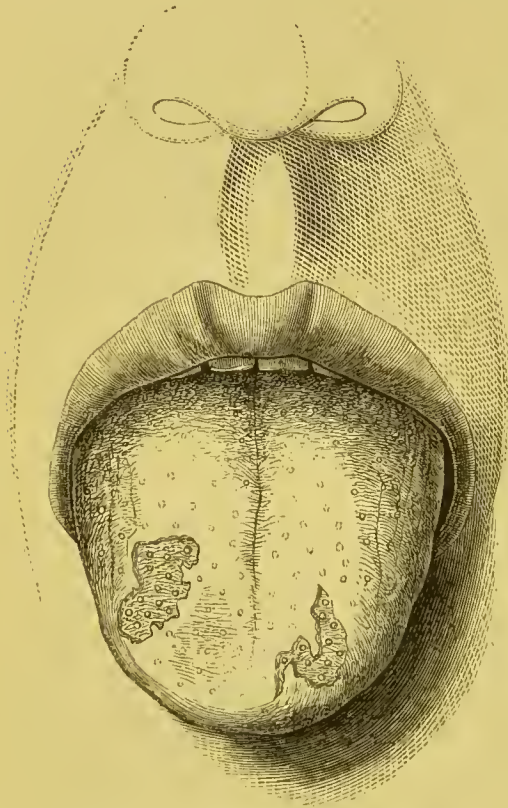


FIG. 21.—Psoriasis of the Tongue.

times it is the sole affection. The case from which Fig. 21 was drawn was of this latter kind. The patient, a middle-aged man, had suffered from syphilis for twelve years, and a characteristic eruption upon his forehead, with deep scars, testified to the fact. During almost the whole of that period he had been subject to a sore tongue. The special form which the disease assumed was *psoriasis*. When he came under my care there was not the slightest

trace of ulceration, fissure, gummy tumour, or any of the more common phases of syphilitic tongue-disease. Indeed the rest of the organ was remarkably healthy ; but on each side of the median raphe near the tip, was a patch of *psoriasis*. He attributed it to the irritation of a pipe. This may have

been the determining cause, but I have no doubt the predisposition was due to syphilis. The epithelium was entirely gone, and the margins of the denuded areas were sharply defined. The naked papillæ could easily be seen standing out from the deep red, raw-looking surface. I prescribed for him, and in forty-eight hours the epithelium was so completely restored that it was hardly possible to tell, on the most minute examination, where the *psoriasis* had been. Shortly afterwards he came back to me with a small patch on the left side. This was the way the disease had gone on for years. He had thought but little of it, and taken no advice. The consequence was that there had been a constant succession of patches of this kind.

When the cause of irritation reaches a certain degree of intensity, or when it has persisted for a length of time, it occasionally gives rise to a peculiar disease of the papillary and epithelial structures, which has received the name of *ichthyosis linguae*. Of this rare affection the most remarkable case that has come under my observation was that of a man, aged thirty-eight, who had been a soldier. Fourteen years before I saw him he had contracted syphilis in India. Subsequently he had gone through nearly the whole series of secondary symptoms, and eleven years before he sought my advice his tongue had become superficially ulcerated. He was then a careless, free-living man, and had neglected himself entirely. If he applied to a surgeon when worse than usual, he discontinued the remedies as soon as he got a little better. In this way the ulceration had crept gradually over a great part of his tongue, and, wherever it had been, the healthy mucous membrane was replaced by a

thin coating not unlike the rough side of white kid leather. In some places this coating was thicker than in others, indeed it had quite a corny prominence and hardness. These were the spots where the ulceration had been the most severe, and where, as the patient told me, caustic had been most freely applied by himself and by the surgeons who had seen him. Figure 22 gives a good idea of the state of the tongue at the time he first came under my care. Here the *ichthyosis* was evidently due to long-standing ulceration of syphilitic origin. But syphilis is only one among many causes which are capable of producing this strange affection. In another well-marked example, which I had an opportunity of examining by the kindness of Dr. Mereer Adam of Boston, there was no history of syphilis, nor any reason to suspect its presence. The disease first appeared as the patient, a middle-aged man, was recovering from an attack of rheumatic fever. In this case the coating of fur was remarkably uniform, of an almost cartilaginous hardness, and arranged in a strikingly symmetrical way on either side of the median line, the rest of the tongue having a perfectly natural appearance. In the case of an elderly man, who was shown to me by Dr. Dowse of the Central Sick Asylum, the coating was distributed tolerably equally over the whole dorsum of the tongue. Here the *ichthyosis* was associated with otorrhœa and dyspepsia.

In the beautiful collection of models presented to the Royal College of Surgeons by Mr. Erasmus Wilson, this disease is well delineated. In the example there represented "the organ is contracted in shape, while the surface is mapped into lobules by ramifying grooves, milk-white in



E Burgess del. et lith.

W. West & Co. imp.

"Ichthyosis Lingua" (Syphilitic.)
Fig. 22.

appearance, granular in texture, and devoid of its usual papillary character." The patient was a shoemaker sixty-nine years of age. The disease had existed three months. It was attributed to indigestion, and treated accordingly; but apparently without success. (Dermatological Collection. No. 262.)

Dr. Andrew Clark mentions that he has seen more than one case among glass-blowers, depending probably upon their occupation.

In the Museum of St. Bartholomew's Hospital, there is a preparation taken from a man who used to shave down the corns on his tongue with a razor. And a case in which the patient followed the same practice has been recorded by Mr. Hulke. ("Med. Times," Nov. 30, 1861.)

For my own part I doubt the propriety of applying such terms as *ichthyosis* and *psoriasis* to the diseases of internal parts. As the mucous membranes differ notably in their structure from the skin, the intimate pathology of their diseases must differ also. For example, in *ichthyosis* of the skin the sebaceous glands play an important part; but the mucosa of the tongue contains no such glands. It would be better, therefore, that these latter cases, of which we have been speaking, should be called papillomata or warty growths—a name which would express their real character, as well as their near relation to epithelioma.

But whatever name we give this disease it consists essentially of an overgrowth of the papillary and epithelial elements of the mucous membrane. The formative power has been exhausted, and no longer exercises its influence over the regular deposition and growth of the tissues. In

Mr. Hulke's case, to which I have just referred, an opportunity was afforded of making a microscopical examination of the affected part; and he says that the section consisted of colossal papillæ, the leathery part was altogether epithelial, the lower cells being clear, transparent and natural, the middle ones granular, and the superficial layer felted together into a dense, opaque mass. There is in fact an exaggerated fur upon the tongue, and, like the ordinary fur, it is apt to vary in adhesion, thickness, and density from day to day, according to the state of the patient's general health, though it never entirely disappears. Sometimes the tongue is comparatively clean in the morning, and loaded in the afternoon. Sometimes the coating is soft and may be scraped off with the finger-nail; at other times it is closely adherent, tough and hard.

Dr. Neligan has related a case in which the existence of this disease had to be specially taken into consideration in examining a patient for life assurance. Here the dense covering had nearly overspread the whole tongue, extending also to the inside of the cheeks, and the surface of the gums in contact with them. The patient was a gentleman aged forty-six, who was otherwise in perfect health. He had first noticed the peculiar appearance of his tongue when he was eighteen or nineteen, and it had not altered much since that time. He attributed it to the excessive use of a short pipe. Five years after he had been first seen by Dr. Neligan he died of cancer of the tongue. ("Dublin Quar. Jour. of Med. Sci.," Aug. 1862.)

Dr. Church has recorded a case in which the left half of a girl's tongue was ichthyotic, the disease being associated

with a similar alteration and hypertrophy of the papillæ of the skin and their epithelium in various parts of the body, more particularly about the neck, axilla, and chest. Here the skin was remarkably soft and pliable. It had not the hardness and rigidity which belong to the ordinary form of *ichthyosis*, and which depend upon desiccated and altered sebaceous matter. The disease both on the external surface of the body, and within the mouth, was strictly limited to the left side. "The whole of the mucous membrane covering the inside of the left cheek, the left half of the soft palate and tongue was the seat of papilliform outgrowths, which closely resembled those on the neck and in the axilla, but contained no pigment, and were of a dull yellowish colour." After the girl's death the foramen ovale was found widely open, and there was a remarkable narrowing of the descending aorta, below the origin of the left subclavian artery. ("St. Bartholomew's Hosp. Rep.," vol. i.)

Mr. Thomas Smith has mentioned to me a singular case of an "earthy tongue," which he saw some years ago in company with Mr. Wormald. The patient, a man about sixty, had on the dorsum of his tongue patches of calcareous matter—white, dry, and rough. They looked as if they could be easily picked off; but, in fact, they adhered very closely. They had existed for several years, and did not give the patient any pain or inconvenience. In this case I presume that a deposit of earthy salts from the saliva had taken place in a thick and persistent fur, like that of *ichthyosis*.

From whatever cause this peculiar tongue disease may arise, it is always very intractable, and all the more severe

examples have a tendency to assume the characters of epithelial cancer. As long as the growth remains homologous, that is to say, as long as the epithelial elements, however hypertrophied, are confined to their normal situation, the disease may be considered harmless. But if it becomes heterologous, if the particles of epithelium dip down into, and invade, the papillæ or the submucous tissues, then the growth has passed into the category of malignant diseases, and must be dealt with accordingly.

(2) Sometimes the mucosa of the tongue is the seat of a vesicular inflammation, to which the name of *eczema* or *herpes* has been given. But, as I have already said, it seems to me better not to transfer the names of skin-diseases to the morbid affections of the mucous membranes. In the disease in question the tongue becomes studded with minute vesicles, which at first have the appearance of clear glass beads, or grains of boiled sago; but afterwards, when the contained fluid becomes purulent, they are yellow and opaque.

In some instances this vesicular eruption forms the primary and sole complaint. When this is the case it arises from local irritation, or from a deranged state of the stomach. Mr. Earle has related the case of a boy at the Foundling Hospital whose tongue was covered with clusters of very minute vesicles. In some places they were separated by deep clefts, which discharged a fetid, irritating sanies. The slightest touch made them bleed profusely. The disease, which had resisted various plans of treatment, both local and constitutional, gradually yielded to perfect quiet and cleanliness, combined with large doses of hyoseyamus. ("Med. Chir. Trans.," vol. xii.)

In other instances the vesicular eruption is evidently secondary, and depends upon the presence of an ulcer, or tumour, which has disturbed the circulation through the organ. In these cases there is little or no inflammation around the base of the vesicles. They seem to be caused by the dilatation of the papillæ in consequence of the passive congestion of the part. In dealing with a case of this kind our attention must first be directed to the cure of the ulcer, or the removal of the tumour, before we can hope for the subsidence of the vesicles.

There is a very chronic form of inflammation—*superficial glossitis*—in which the mucous membrane is affected, but not the muscular substance of the organ. The morbid condition extends no further than the submucous layer of dense areolar tissue; the muscular movements remain perfect, while the mucosa becomes swollen and patchy. The papillæ are obliterated. Glossy, elevated spots are observed. The secretions of the tongue are thick and viscid. The organ seems too large for the mouth, and readily takes the impression of the teeth. Dr. Copland says that this condition is frequently seen in scurvy. It occurs also in some inflammatory affections of the throat, and in some disorders of the stomach and bowels; or it may be caused by taking irritant substances into the mouth. But my own observation leads me to think that it is far more often due to syphilis, or to the prolonged and unwise use of mercury or iodide of potassium, than to any other cause. Perhaps, in some instances, it may be due to the combined effects of syphilis and the antisyphilitic remedies. But, as it is clear that this morbid con-

dition may arise from various causes, it is desirable to make a careful inquiry into the antecedents of the patient, so as to arrive at an exact diagnosis. In most instances it will be found an intractable complaint, and our best hope of dealing with it successfully is to have accurately discriminated the ætiology of each particular case.

The medicines which we are in the habit of prescribing for syphilis are well known to have a special effect upon the mucous membrane of the nose, throat, and mouth, and it is not wonderful that, in some individuals of a peculiar idiosyncrasy, their prolonged and excessive use should give rise to chronic inflammation. But it will be more convenient to consider this subject at length, when I come to speak of the syphilitic affections of the tongue, with which I believe this condition is most frequently associated. I must, therefore, refer the reader to chapter viii.

(3) I pass on now to the consideration of those cases in which the muscular substance of the tongue is either irritated or inflamed.

It is not uncommon to meet with a circumscribed induration in the substance of the tongue, the result of simple hyperplasia, and unconnected with any of the graver forms of induration to which I shall have to allude in subsequent chapters.

The patient, without having experienced any previous uneasiness, becomes aware of a lump in the substance of his tongue. It is attended by no pain, though it is slightly tender on pressure, and thus interferes to some extent with mastication. The movements of the organ, however, are free, and speech is unimpaired. The patient

is not unnaturally disquieted and alarmed by the tumour, but it is in truth a harmless affection, and readily yields to appropriate treatment. It is due to an abnormal development of cell-growth, which is probably the result of local nerve-irritation, or of irritation reflected from some distant part. When such an induration occurs in the deep portions of the tongue it may, if neglected, be the first step towards an abscess. When it occurs near the free surface, the tissue may break down, and an ulcer may be the result. But, whether superficial or deep-seated, if judicious measures are adopted early, the excessive cell-growth will undergo absorption, and the parts return to their natural and healthy condition.

It is an interesting pathological question to consider, why it is that one form of nerve-irritation may give rise to an excessive development of epithelium, constituting ordinary fur; another, to the so-called *ichthyosis lingue*; a third, to a circumscribed tumour; and so on. The attentive study of this obscure subject may sometimes throw a very important light upon the origin of the patient's malady.

Glossitis, or inflammation of the substance of the tongue, arises from many different causes. Fifty years ago, by far the most common of these was the excessive use of mercury. But happily "mercurial glossitis" is now seldom seen. It is rarely that the surgeon desires to produce salivation, and we may say that he never wishes to push it to an extreme. But formerly it was no uncommon thing to see patients who were taking large doses of this drug for the cure of a venereal disease, which may or may not have been of a kind amenable to its influence, in whom the

tongue was enormously swollen, and who were spitting many pints of saliva in the course of the day.

The earliest symptom indicative of this form of mercurialism is a red line along the gums, at their junction with the teeth. The gums are tender and spongy, and, if roughly handled, are apt to bleed. About the same time the breath acquires a peculiar and offensive fœtor, known as mereurial, and the patient has a disagreeable metallic taste in his mouth. As the case advances, the gums, the tongue, and the inside of the lips and cheeks become much swollen. The tongue is sometimes so large as to be constantly protruded from the mouth, its papillæ distended, and the whole organ tinged of a brown hue from the effusion of serum. It is excessively sore and tender. At the edges it becomes deeply marked by the teeth, and it is very prone to excoariation. Flakes of lymph are formed on its surface. The flow of saliva is incessant; the salivary glands are enlarged and painful; and the teeth ache and become loose, though it is seldom that they drop out. The pulse is quick; the respiration shallow and impeded. There is great thirst, but the patient has difficulty in swallowing, and is wholly unable to speak. Such are the symptoms of a well-marked case of mereurial glossitis. As a rule this state of things subsides under proper treatment, but occasionally matter forms in the substance of the tongue, or it may become ulcerated, or even gangrenous.

Some individuals are much more easily affected by mercury than others, and those whose constitutions have been broken by any cause, are the most susceptible to its

influence, and therefore the most likely to be affected with this form of glossitis. Though it is a common observation that children bear moderate doses of mercur̄y well, if it is pushed to an extreme, they are apt to succumb rapidly under its characteristic effects. Dr. Graves has put upon record two remarkable cases of children who died from mercurial glossitis. The one was a girl, aged eleven, who had symptoms of acute inflammation of the trachea. Twenty-four grains of calomel were given in as many hours. Profuse salivation ensued. The whole of the mouth and tongue were affected, and there was swelling of the face and neck. On the fourth day ulceration began at the angles of the mouth, and on the soft palate. It spread rapidly by sloughing, and the patient died on the eighth day after the calomel had been prescribed. The other was a child of two years of age to whom six grains of calomel were given in divided doses. Ulceration followed, and the patient died in a fortnight. ("Dub. Hosp. Rep.," iv. p. 299.)

In some cases acute glossitis arises from a cold or chill; the inflammation, for some reason which it is not easy to explain, attacking the tongue, just as in other cases the same exciting cause might give rise to eryza, quinsey, bronchitis, or pneumonia. Sometimes it is due to the contact of septic substances, or of a tainted atmosphere. Sometimes it originates from eating particular articles of food. Sometimes it arises from taking corrosive or aerid substances into the mouth. Sometimes it occurs in the course of fevers or eruptive diseases; and sometimes it shows itself without any assignable cause. In all these

cases the constitutional phenomena are those which are common to many acute inflammatory diseases. The pulse is frequent, full and hard, becoming gradually weaker as the patient's strength fails. The skin is dry and burning, becoming gradually moist, soft and bedewed with cold perspiration. There is excessive thirst. The bowels are confined. The urine is scanty, high-coloured, and loaded with lithates. The nervous system is irritable, and the patient is restless and cannot sleep.

The local symptoms are a feeling of weight in the tongue, accompanied by a dull, aching pain. The organ rapidly swells, so as to fill the mouth, making speech, breathing, and deglutition difficult. The mucosa becomes brown and coated. The sublingual and submaxillary glands are enlarged and tender, and there is an excessive flow of saliva. These symptoms gradually increase until a thick viscid secretion covers the surface and corners of the mouth; talking becomes impossible, and respiration and deglutition are most seriously embarrassed.

I have selected a few typical cases as examples of the various exciting causes to which I have alluded, and in order to illustrate the usual symptoms and course of the disease, as well as the different plans of treatment which have been adopted from time to time. These I shall now proceed to lay before the reader.

The following is an abstract of a report which is given in Gräfe und Walther's "*Journal der Chirurgie*" (Band vii. Heft 2). The patient, a man of strong constitution, thirty-four years of age, was seen by Dr. G. on the 4th of November, 1823, at a time when there was a great prevalence

of inflammatory and rheumatic pains of the throat. The earliest symptoms were a severe shivering, which lasted an hour, and which came on after rising from bed, succeeded by great heat, and a peculiar dull pain, and feeling of weight in the root of the tongue, as if a lump of lead were in his mouth. There was also an immobility of the organ, any attempt to put it out causing great uneasiness. Deglutition and the power of speech, as might be expected, were much impeded. Violent pyretic symptoms succeeded, with a distressing thirst and great headache. None of the parts adjacent to the tongue showed any inflammatory symptoms. The medicines used were a gargle of decoction of althæa and nitre, with a grain of tartar emetic; barley water with oxymel to be kept occasionally in the mouth; and an opening enema.

On the following morning the tongue was much swelled, dry, hard as a board, red, extremely painful, almost filling the mouth, which was half opened, and could not be closed, thus preventing the patient from speaking, or swallowing much of the fluid which he required to allay his burning heat and thirst. Inspiration was performed with difficulty; there was great anxiety; while the pulse was quick, full, and hard. Twelve ounces of buffy blood were drawn from the arm; warm and emollient vapours were inhaled, and bland liquors were taken often, but in sparing quantities.

In the evening the symptoms were even more severe, though the pulse had somewhat abated in its fulness and hardness. The tongue, which was still dry, red, and exquisitely painful, protruded from the mouth, and the jaws

were immovable. The patient was tormented with heat in the inflamed part and with thirst; yet could take no fluid. All the other concomitant symptoms of pyrexia were increased. Fifteen leeches were applied under the chin, and a blister over the bites; and every quarter of an hour injections, by means of a syringe with a long pipe, were made into the mouth, consisting of decoction of marshmallows and nitre. Cold applications of nitre and sal ammoniac were also made to the tongue, and the inhalation of warm and emollient vapours was continued every two hours. The enema was repeated.

On the 6th, after the patient had passed a sleepless and restless night, the fever began to abate, though deglutition was still impeded, and the thirst was distressing. A tough slime was discharged from the corners of the mouth. On both edges of the tongue, which in other respects was as before, were two white and moist streaks. In the evening, under a continuation of the same treatment, the patient was much better, a copious flow of saliva having diminished his distress. The symptoms gradually abated, and on the 14th he returned to his usual occupation. ("Edin. Jour. of Med. Sci.," vol. i. p. 53, 1826.)

Dr. Maillier has related the history of a vine-dresser of Flonville, a man of tall stature, of perfect health, and accustomed by his occupation to support all the ineluctables of the weather, who was seized early in February, 1824, with a severe coryza. It did not, however, prevent him from attending to his ordinary work.

In the course of the 10th of February, he felt an unaccountable numbness in his tongue. Soon afterwards

this attained so large a size that the buccal cavity could not contain it. These symptoms increased during the evening and night. At two o'clock in the morning, Dr. Maillier says he found the patient in the following condition :—He was seated, being unable to keep his bed. The pulse was full, hard, and very quick. The skin was dry and hot, except the face and neck, where it was covered with a cold sweat. The tongue was very much swelled, and red ; it was pushed forward about an inch beyond the lower row of teeth, and was excessively sensitive. A thick saliva flowed abundantly upon the patient's clothes. The palate was hung round with an extremely viscid mucus of a greenish-yellow colour, and this mucus also covered the dorsal surface of the tongue. The patient felt very acute pain and heat over the whole of the back part of the mouth. He was hungry and thirsty, but he could swallow no food, and speech failed him. Fourteen ounces of blood were taken from his arm, barley-water with oxymel was given to keep the mouth moist, while a large poultice of bread and marshmallows was applied under the chin.

At three o'clock in the afternoon, the patient was in the same state, the bleeding had not given any relief. Twelve leeches were applied to the neck and under the chin ; gargles were used, and the means before employed were continued. Several lavements of fat broth were administered.

The next day the patient was much better. The swelling of the tongue had diminished. Deglutition began to be restored, so as to allow him to partake of some strong broth, and a decoction of honey and barley-water. The poultices were repeated. On the 13th the affection had totally

disappeared, and health was re-established. ("Jour. Univ. des Sciences Méd.," July, 1824.)

In the following case the glossitis was associated with a disturbance of the catamenia. A stout young woman, after exposure to cold, experienced a considerable diminution of the menstrual discharge. Not long afterwards she was attacked with severe pain in the throat, impeding deglutition and the movements of the tongue. This then began to swell, and soon became so voluminous as to block up the fauces, project out of the mouth, press down the lower jaw, and cause a distressing sense of impending suffocation. At the commencement of the attack, irritating elysters were given, leeches were applied to the vulva, and blood drawn from the feet, but in vain. At last her medical attendant had recourse to the expedient of making two deep incisions from the base to the tip of the tongue. A few hours afterwards the swelling had abated so considerably that the woman was able to close her jaws. The tartrate of potash and antimony were then prescribed, even to the extent of producing vomiting. Her state continued rapidly to improve, and she was quite well on the eighth day. ("Edin. Med. and Surg. Jour.," vol. xxi. p. 235, 1824.)

Mr. Lyford ("Lancet," 1828, p. 16) relates the case of a labourer, aged forty-five, who had a "prodigious enlargement of the tongue," which was attributed to a slight cold. The symptoms had only commenced the evening before he was seen by the surgeon. Twelve leeches were placed on the protruding portion of the tongue; five grains of calomel were ordered; and an ounce and a half of cathartic mixture was given immediately. As no improvement took place,

three very deep and long incisions were made in the tongue, and hæmorrhage to the extent of six ounces followed. Subsequently ice was constantly applied to the part in a bag. Still no improvement took place. The glands under the jaw became excessively enlarged, and there was a general puffiness of the whole neck. As the patient was now too weak to bear any more bleeding, a large blister was applied under the jaw, and the ice was discontinued. On the second day the enlargement was the same as before, and the patient was evidently sinking. In the afternoon he died,—“the tongue having neither diminished nor increased in size from his first admission to the Hospital.” This case ran its whole course in less than forty-eight hours. At the autopsy no unnatural appearance of any kind could be detected.

In the “Medical Gazette” Mr. Taynton relates a case of great and rapid enlargement of the tongue. The patient was a man aged thirty. The enlargement came on in the evening of the 16th of June. By the 18th the tongue was prodigiously swollen, hard, and very painful if pressed. His wife attributed it to his having remained for some hours in wet clothes. The tongue was deeply incised; a large blister was applied from ear to ear, and two drops of croton oil were swallowed, though with some difficulty. In the evening of the 19th he was better; on the 20th, convalescent; and on the 21st, “almost well.” (Vol. xii. p. 465.)

Mr. Leggatt relates the case of a gentleman who was attacked with acute glossitis from falling asleep in a railway carriage with the window open. Leeches were applied upon the tongue and under the jaw, and plenty of nourishment and stimulants were administered. The patient

recovered perfectly in three days. ("Lancet," Feb. 2, 1861.)

From the foregoing cases, we see that the conditions which give rise to influenza, sore throat, and the like, are also the most frequent causes of inflammation of the tongue. I shall now briefly mention some rarer causes of the same affection.

Acute glossitis has been produced by the direct absorption of septic substances. Heyfelder gives an account of a Prussian butcher, who, when slaughtering a diseased sheep, put the knife between his teeth, and held it there for some time. In two or three days the margin of his tongue was covered with black pustules; the organ swelled to an alarming extent, and he suffered acute pain. Violent fever set in, and he died in sixty hours. ("Med. Vereinszeitung," 1834.)

Inflammation of the tongue has been caused by eating various unwholesome or poisonous articles. Thus, there is the well-known case mentioned by De la Malle, of a peasant who undertook for a wager to eat a live toad, beginning at its head. Two hours afterwards his palate, tongue, and the inside of his mouth and lips had swollen greatly. The glossitis was intense, and did not abate until incisions had been made in the tongue. ("Mém. de l'Acad. de Chir.," vol. v.)

Dr. Copland saw a case of glossitis which was caused by inadvertently chewing monkshood. It has also been attributed to eating bilberries. ("Syd. Soc. Year Book," 1862.) In the "Medical Times" (1866, i. 301) a case of a similar kind is reported, which was due to eating celery.

In the same journal a case is mentioned which accompanied urticaria (1866, i. 110) ; and Sir Thomas Watson speaks of a nobleman who could never eat shell-fish without having a crop of ulcers on his tongue within a couple of hours. This we may look upon as a sort of internal urticaria. ("Principles," 4th ed. ii. 819.)

In the "Medical Times" for Sept. 29, 1860, the case is recorded of a sailor who was seized with glossitis after a bout of free living and hard drinking. His tongue protruded beyond the teeth, and was three times its natural size. The sublingual mucous membrane was raised, as it were, into a second gum by serous infiltration. The saliva ran down his chin. He was unable to speak distinctly, and had great difficulty in swallowing. There was severe pain in the tongue, and it felt hard and brawny. A mixture of carbonate of ammonia was ordered, and acetum lyttæ applied externally. But as there was no improvement, and the tip had become purple, and suffocation seemed imminent, several free longitudinal incisions were made in the under-surface. There was not much bleeding, but the relief was great. Next day the tongue was smaller, but as there was still difficulty in swallowing, the incisions were repeated. The day after he was much better, and in ten days he was quite well.

Sir James Paget operated upon a case of hypertrophy of the tongue, in which the enlargement originated in an attack of glossitis following scarlatina. ("St. Bartholomew's Hosp. Rep.," i. 62, 1865.) Indeed, slight attacks of inter-current glossitis are not infrequent in the course of eruptive fevers, and in the fevers of tropical countries. On the

West Coast of Africa such inflammations of the tongue are said to be often fatal.

In the foregoing cases a reason could be given for the glossitis, but it occasionally happens that it arises spontaneously, and without any assignable cause. In the twelfth volume of the "Medical Gazette" Mr. Collier relates the case of a woman in the last month of her pregnancy, who was unaccountably affected with sudden and enormous enlargement of the tongue. It was treated by scarifications and incisions, and got speedily well, notwithstanding that delivery took place while the disease, though not quite at its height, had only just begun to subside.

In the "Memoirs of the Medical Society of London" (vol. ii. 185) the following case of glossitis is related by Mr. Thomas Hayes. At 7 A.M., on January 2nd, 1781, he was called to a labourer, who had that morning gone out to work as usual between five and six o'clock. As he was walking across Hampstead Heath he felt as if his tongue was swelling. He was at once bled and purged. At eleven his tongue was amazingly swelled, his face exceedingly florid, he complained of intolerable pain in his back and loins, and he could scarcely sit up while he was bled a second time to sixteen ounces. The tongue was so swelled as to impede his breathing, and it was with the greatest difficulty that he could swallow. Warm injections were made into the mouth; elysters were given; his feet were put in hot water, and a nitrous saline with tartar emetic was ordered to be taken as often as possible. As his pulse was still strong and full, ten more ounces of

blood were drawn in the evening. Next day "there was not the least abatement in the size of his tongue, and it now began to look of a dark black colour, or rather as if it had been broiled over a smoaky fire." The antimonial mixture was continued, and a large blister applied round the whole neck. But this was removed before it had risen, and a poultice was placed on the throat, and another large blister applied between the shoulders. These measures were followed by no amendment. On the morning of the 4th he was much the same. Four grains of James's powder were then ordered to be taken every third hour. At midday there was no improvement. At night the doctor was summoned in haste, as the patient was supposed to be dying. Again he was bled, and a second blister applied round the throat. As soon as this began to draw, the tongue gradually lessened, and became white and moist; he breathed more freely, and the next day he was out of danger.

It is not uncommon to find in glossitis that one side of the tongue is chiefly, or even solely, affected. The following case which has been put upon record by Dr. Graves ("Dublin Hosp. Rep.," vol. iv. 43) gives a good instance of this peculiarity.

"Mr. B., a medical student, solicited my attendance. I found him labouring under severe febrile symptoms of a week's continuance, ushered in by violent rigors, great pain in the neck and occiput, somewhat relieved on the second day by profuse epistaxis. The left half of the tongue became then very tender and painful, and gradually increased in size. At my first visit it was enormously

swollen, and nearly filled the entire cavity of the mouth, which could scarcely be closed on account of the protrusion of the tongue. The right half of the tongue was perfectly natural, and its comparatively diminutive size formed a striking contrast with that of the left, the median line forming a perfect boundary between the swollen and the healthy parts. Two or three applications of six leeches at a time to the inflamed half, part of which at my first visit appeared on the verge of gangrene, produced a speedy decrease of the tumour and inflammation. The bleeding from the leech-bites was very great. In consequence of the detumescence of the tongue, articulation and deglutition, which before had been very difficult, were quickly restored. He is at present (two years since the attack) able to speak perfectly, although the left half of his tongue is still perceptibly increased in size."

De la Malle effected a cure in a very similar case in a girl by making a long and deep incision in the swollen side of the tongue. In three days the patient was quite well. ("Mém. de l'Acad. de Chir.," vol. v.)

Mr. Holthouse has related a case in which both the tongue and the hypo-glossial region were affected, the stress of the disease falling chiefly upon the latter. ("Clin. Soc. Trans.," ii. 140.)

The patient, a tall, strong, healthy labourer, was admitted into Westminster Hospital, Dec. 20, 1868, with the following symptoms. Saliva poured from his half-open mouth, as if he were under the influence of mercury, but there was no foetor of the breath. The tongue formed a hard, solid lump, filling up the posterior part of the mouth from floor to roof,

and was perfectly immovable. It was of the shape of the tongue when contracted, *i.e.*, more or less globular, and the whole of the hypo-glossial region was affected with a sort of solid œdema, which formed another tumour in front of and below the tongue, and filled up the entire space of the floor of the mouth to a level with the free edge of the teeth of the lower jaw. With some difficulty, owing to the pain caused by the pressure of a spatula, a view of the soft palate and uvula was obtained. They were quite free from inflammation or œdema. The patient's breathing was unaffected, but he could swallow nothing but liquids, and his speech was so indistinct that it was with great difficulty he could make himself understood. There was some fulness and tenderness of the submental region, but none of the sub-mastoid. The patient stated that on the 19th, while eating his dinner, consisting of bread and cold beef, he found his tongue becoming stiff and large. He returned, however, to his work until four o'clock, when he discovered that he was unable to move his tongue in the slightest degree, or to swallow anything solid, but he felt perfectly well, and had no pain. He was speedily cured by an emollient gargle, a mustard plaster to his throat, and a mixture of sulphate of quinine. Mr. Holthouse suggests, as a possible explanation of the case, that there may have been a slight breach of surface in the mucous membrane beneath the tongue, and that some septic or other injurious matter may have been introduced into the wound during his meal.

From the foregoing cases we may conclude that acute glossitis, however formidable in appearance, has generally a

tendency to spontaneous recovery. A favourable change sometimes sets in as early as the third day, usually within a week; but this happy result does not always take place. Sometimes the inflammation proceeds to suppuration, sometimes to ulceration, and sometimes even to gangrene.

Suppuration in the substance of the tongue—the formation of an abscess—is one of the recognised diseases of the organ, and a thing with which the surgeon ought to be familiar, because a simple collection of pus, more particularly a chronic abscess, may sometimes be mistaken for much more serious disease, and the patient and his friends be unnecessarily alarmed.

When the surgeon is first called to a case of abscess, it may be difficult to arrive at an exact diagnosis. There may be a circumscribed swelling, which is not unlike various other enlargements that are met with in the same situation. But careful inquiry into the history of the case and the commencement of the disease will generally serve to determine its nature. Simple abscess is usually preceded by more or less glossitis, and the phenomena of such an attack are well marked. If matter forms there will probably be some abatement of the febrile symptoms, with chills over the surface of the body, or perhaps distinct rigors, and at the same time there will be a diminution of the local pain and tension, with a tendency to pointing. The following cases illustrate the course which such an abscess generally runs.

A strong, robust woodsman, after exposure to inclement weather, was seized with sore throat and difficulty of swallowing. These symptoms were neglected by him. In

a short time the tongue became so swollen that he was nearly suffocated. Dr. Schneider was summoned to him in great haste, and found him in considerable danger. The tongue was of a bluish-red colour, and so tumefied as to fill the whole mouth and protrude beyond the teeth. On the right side the throat was hard and tender to the touch. The pulse was full and quick. The patient was bled to twelve ounces, and sixteen leeches were applied to the throat. These means gave some relief; but still greater benefit was experienced from a longitudinal incision in the tongue, a quarter of an inch in depth. An antiphlogistic mixture of nitre and decoction of althæa was at the same time employed. Deglutition and speech were restored; but the patient still felt severe pain deeply in the substance of the not yet completely reduced tongue, especially during deglutition. A poultice was applied to the painful part for three days, at the end of which time the swelling relieved itself by the discharge of a considerable quantity of foetid pus, and the cure was rapidly completed. (See "*Prov. Med. and Sur. Journ.*," 1850.)

Mr. Annan of Kinross has recorded the case of a farmer who was attacked with glossitis in consequence of getting his feet wet in crossing a brook. The early treatment consisted in emollient poultices and gargles. On the fifth day two incisions were made at the most prominent part of the swelling, but only blood escaped. The patient, however, felt much easier. In the evening an abscess burst through one of the incisions. The relief was immediate. The tongue rapidly diminished in size, and on the twelfth day he was quite convalescent. ("*Med. Times*," vol. xxvi. 1852.)

In the "Provincial Medical and Surgical Journal" for 1844, Mr. Ranking of Bury-St.-Edmunds relates a case which ran a much more acute course. A lad, aged seventeen, put a grain of barley into his mouth. The beard penetrated under his tongue, and gave rise to an acute inflammation at the root of the organ. On the seventh day the patient died in a state of collapse. After death a gangrenous abscess, the size of a turkey's egg, was found occupying the situation of the genio-hyo-glossi muscles and the substance of the tongue, as far back as the epiglottis. In the centre of this mass of gangrene there was a portion of barley beard, an inch in length. In this case the early treatment consisted in the application of leeches to the neck, followed by a blister, and the bowels were freely acted on by calomel and senna. Subsequently ammonia and brandy were given, with morphia; and several deep punctures were made with a bistoury in the neighbourhood of the sublingual glands in the hope of evacuating pus, but without success.

An abscess may form far back at the root of the tongue, in the middle line or at one side. In such a case the symptoms are very urgent. In consequence of the backward and upward pressure both respiration and deglutition are seriously embarrassed. Moreover, the pliable nature of the tongue, and the depth at which the collection of fluid is placed, makes it difficult for the surgeon to detect its presence with anything like certainty. The diagnosis, therefore, can scarcely be more than inferential. The history of the case, the general pyrexia, the glossitis, the throbbing pain, the local swelling and tension, the occurrence of

rigors—these are the main points which must guide us in arriving at a conclusion. Even after the abscess has healed there will remain for some time more or less induration of the surrounding tissues in consequence of the exudation of lymph, which will only be absorbed very gradually.

Syphilitic abscess, the result of softening taking place in a gummatous tumour, may be distinguished by the previous symptoms of the patient. There will be a history of venereal infection, probably other manifestations of the disease will be present, and there will be an account of a painless tumour slowly forming in the tongue for some time before it has softened and discharged. The whole progress of the case is chronic. In the chapter upon the syphilitic affections of the tongue I shall treat more fully of this subject.

Simple ulceration of the tongue is by no means uncommon. It is most apt to occur in dyspeptic persons of a full habit of body, who have usually a bright florid congestion of the tongue, and who habitually eat and drink freely. Such ulcers are generally situated upon the sides and upper surface of the tip, but not unfrequently they are found in the folds of the frænum. It is necessary, therefore, that a careful search should be made for them. They are encircled by an inflamed margin, their edges are rounded and bevelled, they are very sensitive to the touch, and painful when the organ is moved, and they run an acute course. Such ulcers as these may be said to arise from internal causes.

But it is still commoner to meet with ulcers of the tongue which are due to external causes. The organ, from its situation, from its frequent movement, and from the variety of substances with which it is brought in contact is

apt to be locally irritated, and to ulcerate. Thus, in addition to the articles of food, which are introduced into the mouth, some of which may act injuriously upon the tongue, it is liable to be bitten, or scalded, or wounded with knives or forks. But such injuries are usually slight and transient. The more serious forms of ulcerative disease generally owe their origin to some persistent source of irritation, as the pressure of a jagged tooth, or a rough accumulation of tartar. It is, however, worthy of notice that as long as the patient's general health is good the tongue tolerates the irritation, but if his digestion becomes impaired the irritated spot may at once break down and ulcerate. At first, that portion of the tongue which is in contact with the offending points becomes more vascular than usual, of a brighter red, and the papillæ are somewhat enlarged. If the irritation continues, a slight circumscribed swelling occurs, and subsequently the tissue softens, and a small ulcer is the result. If appropriate treatment be not at once adopted, such ulcers get rapidly worse. They become foul, excavated, with irregular, callous edges, and a thickened base. The tongue is furred, the breath is offensive, and it is evident that there is considerable derangement of the stomach. It is painful to move the tongue, and to this extent speech is interfered with. If such an ulcer is neglected, it may lead to the most serious consequences, even determining the seat of a cancer. When there is a large, deep, spreading ulcer in the tongue, when the lymphatic glands at its root are becoming indurated as the result of the acute inflammation, and when the patient's general health is failing, he must be considered to be in a position of extreme jeopardy.

On the treatment which is then adopted it depends whether he is restored to health, or whether his disease assumes the clinical features of a malignant sore.

The importance of examining into the cause of such an ulcer, to see if it depends upon some local source of irritation, is pointed out by Hippocrates, and enforced by Celsus. "When there is a chronic sore on the side of the tongue," says the former, "the surgeon should examine whether it be not occasioned by the sharp edge of a tooth." ("On Prognostics," Syd. Soc. Translation, i. p. 261; and Celsus, vi. 12.) The offending tooth may be either in the upper or lower jaw. Sometimes a rough edge in the lower jaw irritates the tongue as it lies at rest. Sometimes it comes in contact with a sharp point in the upper jaw in every movement that it makes. But wherever it is situated, the source of the mischief ought at once to be removed, or at least the irritating points should be smoothed down, so that they may do no more harm.

The distinguishing features of syphilitic ulceration I shall speak of hereafter. Many of these inflammatory and ulcerative conditions are very intractable; no doubt because they have been preceded by a debilitated constitution, and a deranged state of the digestion. While the stomach acts upon them, they react upon the stomach; and thus the surgeon must be prepared to find that he has to deal with a very obstinate disease.

In cases of extensive ulceration about the floor of the mouth or base of the tongue, the hyoid bone may be affected with necrosis. An example of this kind has been placed on record by Mr. Spry. The necrosis was the

result of wide-spread ulceration, which began in the throat, and extended until the bone was laid bare. It was then expectorated entire. The patient died some weeks later. The bone was altogether deprived of periosteum, was irregular on its surface, and in a complete state of necrosis. (Quoted by Hyde Salter, "Encyc. of Anat. and Phys." Art. Tongue.)

It is no uncommon thing in cancer of the tongue to see extensive sloughing. Thus, I have known a case in which the anterior two-thirds of the free portion on the left side separated in this way. In these cases the mortification may be brought about by mere debility, the blood supply being insufficient; or it may be due to the pressure of enlarged glands upon the arteries of the tongue. In the case to which I have just alluded, the glands beneath the jaw and down the neck were much enlarged and indurated, and the slough corresponded exactly to the distribution of the ranine branch on the left side.

In other instances portions of the tongue may slough from various causes. Examples are on record, in which this organ has perished in whole, or in part, from what the reports term "cancers," but which were evidently not of a malignant nature. They were, no doubt, instances of "glossanthrax," malignant pustule, or sloughing phagedæna, affecting the tongue, just as sometimes we see other organs lost in the same way. The well known case of Margaret Cutting was of this kind; and Roland has related the history of a boy who lost his tongue in the course of an attack of small-pox. Both these cases I shall elsewhere give at length. As a modern example

of the same kind of disease, I may draw attention to a case which has been recorded in the "British Medical Journal" (Nov. 8th, 1862) by Mr. Augustin Pritchard. A coal miner, aged fifty, had a pimple on the left side of his tongue for ten months before his admission into hospital. He attributed it to excessive smoking. This pimple gradually became worse till his whole tongue was red, hard, and immovably fixed, though not enlarged or ulcerated. There was no glandular affection or other sign of cancer. After a few days the tip became soft and dark, and ultimately turned quite black. The gangrene spread until the whole tongue became a mass of soft, black, putrefying tissue. The difficulty of swallowing was so great that the poor fellow was reduced almost to the point of starvation, and by the time the slough began to separate he was pulseless. The case appeared desperate. There was every prospect of his immediate death from starvation, and besides there was the risk of the extension of the disease to the pharynx and glottis. To relieve his sinking condition he was ordered injections of strong beef-tea with brandy, and from this time he began to amend. The ragged and putrid mass, which represented his tongue, came away in shreds, and at the end of three weeks from the commencement of the mortification, the slough had all separated, leaving a tolerably clean surface, covered with flabby granulations, and just high enough to hide the epiglottis. The subsequent progress of the case was satisfactory. The patient rapidly recovered his strength, and was able to speak tolerably well, though he had some difficulty in swallowing.

Dr. Ballard has put upon record a very interesting case of a gentleman, aged seventy-eight, in whom the greater part of the tongue sloughed away, the right side being more affected than the left. The only symptoms which preceded the mortification were deep seated pain in the right side of the neck and occiput, and the sloughing appeared to be due to some obscure affection of the nerves which supply the tongue. The patient recovered, and could afterwards speak and swallow with ease. ("Med. Times," March 20, 1869.)

Occasionally the tongue is found to be attached more or less extensively at its sides and under-surface to the corresponding surfaces of the mouth. These adhesions, as I have elsewhere said, may be congenital; but more often they are the result of ulceration or sloughing. I have seen a case in which the contraction after a large abscess in the left side of the tongue and hypo-glossial region had wasted and drawn down that side of the organ. South ("Chelius's Surgery," ii. 314) mentions a case in which the side of the tongue was attached to the extent of half an inch, and in which he freed it by passing a ligature round the band of adhesion, and thus dividing it. Bernard relates a similar case in which inflammatory adhesions of the thickness of two lines and a half had bound down each side of the tongue to the extent of an inch. They were divided by scissors. ("Revue Médicale," Oct. 1825.)

Maurrain refers to a child, aged six, who was brought to him because he was unable to speak. It was found that the tongue was bound down by adhesions which had resulted from scurvy. They were cut, and the child

speedily recovered his speech. (“*Mém. et Prix de l’Acad. de Chir.*,” vol. vii.)

The treatment of these irritative and inflammatory conditions of the tongue is a matter of great importance, because if they are not accurately discriminated and properly managed, the consequences may be of the most serious kind.

Before speaking of that part of the treatment which is more strictly surgical, it may be well to give some general directions with regard to the regimen to which all patients should be subjected who have any inflammatory, ulcerative, or cancerous disease of the tongue. The great aim of this regimen should be to procure perfect rest—rest both physiological and mechanical. With this end in view, it is desirable to remove all local sources of irritation; such, for example, as the stumps of decayed teeth, or the roughness caused by accumulations of tartar, or by the fixings of artificial teeth. These are the commonest sources of irritation, but sometimes a salivary calculus or a spiculum of bone from the ramus of the jaw may need to be taken away. Having removed everything which might irritate the morbidly sensitive surface of the tongue, the next point is to direct the patient to give the organ as much repose as possible—to talk little, and to avoid all hard, tough, acid, and pungent articles of food, which he cannot eat without causing pain and aggravating his complaint. Indeed such patients cannot be too careful about their diet. There is such an intimate sympathy between the stomach and the tongue, and everything which disagrees with the former so immediately affects the latter, that there is need of great caution. But besides this, as food cannot be eaten without

coming in contact with the tongue, and calling for the exertion of its muscles, it is important that the diet should be not only wholesome, but also soft, smooth, and unirritating in its nature. If it agrees with the patient, there is nothing better than a milk diet—a diet composed wholly or chiefly of new milk as it comes from the cow. If, however, this does not suit the patient, or if he requires a more supporting food, he may be allowed boiled eggs, or beef tea, or jelly made either from calves' feet or gelatine. But in preparing these articles no spice or flavouring should be used that can possibly irritate the morbid portion of the tongue. Fluids can be swallowed with so much less movement than solids, or even semi-solids, that it is very desirable to adhere to them entirely, at least for a time, except in those rare cases where any special symptoms indicate the necessity for more solid nutriment. This fluid diet may be varied by such things as tea, coffee, or cocoa, all of which should be made with a large admixture of milk. Barley water will be found a refreshing and soothing beverage; and, if milk be added to it, it becomes a very nutritious article of diet. The well-known cooling saline composed of cream of tartar, lemon juice, sugar and water, and which passes under the name of "Imperial drink," is very suitable where there is much feverishness. Cold, weak tea often answers well in the same class of cases. Where a greater variety of beverages is desired, there are several French syrups, which, when mixed with water, will be found both agreeable and soothing. Among these we may mention the Sirop de Nafé, and the Sirop de Laetueine.

It is often a question whether alcoholic stimulants ought

to be recommended in these cases. In some degree the surgeon must of course be guided by the previous habits of the patient; but, as a rule, the whole class of spirits and the stronger wines, such as port or sherry, ought to be avoided. But where the state of the general health points to the necessity for some stimulant, some weak beer, or a little wine or spirit largely diluted may be allowed, or the lighter French and Rhenish wines may be recommended. Sometimes, when even the small amount of alcohol contained in these is painful to a raw and tender tongue, they may be taken with seltzer or soda-water. If the patient wishes to have them iced, there can be no objection, and it will often be found advantageous. In a few cases it may be desirable that all the nourishment should be taken through a tube. As the tongue heals, the patient may begin to take soups, light puddings, fish, pounded or minced meat, and thus gradually return to his ordinary diet.

But there are other things besides diet to which the surgeon's attention ought to be directed. A cessation from business and a complete change of air and scene is often a matter of the first importance for the patient suffering from this class of diseases of the tongue. If there is a simple nodule in the substance of the organ, the result of hyperplasia, an improvement in the general health may go far to promote its absorption. If there is an ulcer of the ordinary kind, arising in a great degree from a disordered digestion, change of air may be a primary point in the treatment. Such is particularly likely to be the case with those who habitually live in large cities, and whose minds are occupied with the anxieties incidental to im-

portant business transactions. A fortnight in a well-selected country air, or at the sea-side, may do much to expedite the cure. Where the constitution is depressed by syphilis, or invaded by the cancerous cachexia, the value of any means which will improve or sustain the vital power is obvious. In all inflammatory and ulcerative conditions of the tongue, where the repose of the organ is essential, it is desirable that the invalid should be away from his business, so that he may not be obliged to speak. If he is ordered to a picturesque part of the country, or to an interesting health-resort, he may derive plenty of amusement and instruction through his eyes and ears without using his tongue.

The surgeon will often be asked whether patients whose tongues are diseased should be allowed the use of tobacco. I have no hesitation in saying that, as a rule, smoking ought to be forbidden. In not a few instances ulcers, and even cancers, have been traced to the irritation caused by the pipe or cigar. I have frequently found on inquiry that patients with tongue disease had of their own accord given up the practice because they found that it aggravated their complaint. One patient, an old tar, who was very fond of both his pipe and his quid, and who had a flat, syphilitic ulcer on the dorsum of his tongue, told me that at first he used to lay a piece of calico over the sore to enable him to continue his favourite indulgence. But it was of no avail; and after a time he was obliged to give up both smoking and chewing. Such being the experience of those who are suffering from tongue disease, there can be no doubt that it is safest and best to lay aside altogether a practice which

may tend to keep up a morbid condition, or which may even make bad worse. Where no actual disease was present in the tongue, I have seen cases in which the irritative effect of smoking or chewing an excessive quantity of tobacco was very apparent in the corrugated state of the mucous membrane, and in the thick, foul fur which had accumulated upon it.

Having secured a proper regimen, the next question for us to consider is what can be done for the patient by means of medical appliances and medicines.

The morbid accumulation and desquamation of epithelium, which constitutes the so-called *psoriasis linguae*, will readily yield to an alterative, and some soothing local application, supposing that it is not of syphilitic origin. The pulv. rhei co., or gray powder, should be ordered to be taken night and morning, and the patient should be recommended to let mucilaginous drinks form a large proportion of his diet, and to suck honey, or lozenges of bismuth, jujube, or simple gum arabic, so as to lubricate the surface of the tender spot. Subsequently his general health should be re-established by tonics.

With regard to the treatment of the so-called *ichthyosis*, I believe that here, as in so many other affections of the tongue, the first object of the surgeon ought to be to secure the maximum of rest for the organ. As irritation in some form or another is at the root of the disease, rest, physiological and mechanical, is the appropriate antidote. It is the more necessary to insist upon this, because there is no internal remedy, and no outward application, which seems to have the least power over the disease. I have tried many drugs—*e.g.*

iodide of potassium, arsenic, quinine, and the mineral acids—but none of them produced any permanent improvement. So far as they amend the general health they are useful, but they have no power to cure the disease. Washes of various kinds have been used, and caustics, mild and strong, have been applied; but the disease either remains *in statu quo*, or advances in spite of them. One thing is evident, and that is, that all debilitating excesses, as well as everything which deranges the digestion, aggravates the disease. The surgeon ought, therefore, to study to make the tenour of his patient's life even, to strengthen his digestion, to quiet his nervous system, as well as in every way to allay the local irritation. In some cases the altered condition of the mucosa has a prejudicial effect upon the general health, and produces dyspeptic symptoms. If the patient would give his tongue rest, talking as little as possible, living entirely upon a liquid diet, and attending carefully to his health, he would put himself in the most favourable position for obtaining a cure. But to most persons such strict rules are more painful than the disease. They do not understand their necessity, and they will not submit to them. They are ignorant of the ultimate risk, and the present evil is not sufficient to induce them to exercise so much self-restraint.

In a case where the affected part is not of any great extent, early and complete removal might be successful. But this is very doubtful. Mr. Hancock tells me that in a case where he excised a patch of *ichthyosis* which was not so large as a sixpence, the disease speedily returned, and the patient ultimately died of cancer of the tongue.

Where a vesicular eruption is the primary and sole complaint, our object must again be to give the tongue complete rest, to allay the local irritation, and to rectify the state of the *primæ viæ*, whose disordered condition is, in all probability, the origin of the malady. With this object the general directions just given ought to be enforced, the patient should be encouraged to take warm, bland drinks, and to inhale the steam of hot water, while a mouth-wash of chlorate of potash, or mel boracis, or some similar detergent or emollient substance should be ordered. At the same time an alterative medicine should be prescribed, to be speedily followed by stimulants and tonics. Hyoseyamus in large doses has a most beneficial effect. If it is found that a wash or gargle causes too much muscular movement, and consequent pain, the inside of the mouth may be very easily and conveniently cleansed by means of a stream of warm water from a small syringe or elastic bottle. Mercury seldom fails to aggravate these cases, so that even in the milder forms which are used as alteratives it should be avoided.

In a case of simple induration the iodide of potassium, or corrosive sublimate, should be given to promote the absorption of the cell-growth; or tonics may be prescribed with the view of improving the patient's general health, and bringing about the resolution of the circumscribed thickening.

If there is reason to think that the inflamed state of the tongue has been caused by mercury, the drug ought at once to be discontinued, and a brisk, saline purge administered. Sir William Lawrence recommends that leeches should be

applied beneath one or both jaws, as the measure which produces most immediate relief. But it is only in aggravated cases, such as are now seldom seen, that this will be necessary. Chlorate of potash should be given in doses of from ten to twenty grains. As a local application, port wine and water in equal parts forms a very suitable astringent; and, if it be iced, it will prove both more efficacious and more agreeable to the patient. Tincture of myrrh, or brandy, diluted with three or four times the quantity of water, or a solution of alum in infusion of roses, or the liquor sodæ ehloratæ, or ehlorate of potash in water—any of these are good mouth-washes for such a case. Sir Robert Christison has seen great benefit derived from a lotion composed of one part of ehloride of lime in a hundred parts of water. Mr. Busk recommends that the affected parts should be lightly brushed over with strong hydroehloric acid. The application is said to give hardly any pain, and to be very effectual.

In all diseases attended by much enlargement of the tongue, and more especially where the enlargement takes place rapidly, the surgeon should be careful to see that the teeth do not press unduly upon it. If they do, the soft and swollen tissues break down, and ulcerations occur which add very much to the distress of the patient. To avoid this, the jaws should be separated by suitable gags, and any teeth which are evidently doing harm should be removed.

If mereury has produced salivation more speedily than it would otherwise have done, in consequence of the impaired constitution of the patient, or because of privations

to which he has been subjected, care should be taken to prescribe tonics, to see that he is properly fed and warmly clad, and in every respect to place him in favourable hygienic conditions. Under this treatment, mercurial glossitis can generally be subdued in a few days.

In acute inflammation of the substance of the tongue scarification,—either one or two long incisions, or a number of punctures with the point of a lancet—or the application of leeches beneath the jaw, may be needed, if the symptoms are urgent, and the patient plethoric. De la Malle has given several cases which illustrate the value of this line of treatment. But generally milder measures—a saline purgative, or two or three drops of croton oil, followed, if need be, by enemata from day to day, together with a mustard-plaster to the throat, and a suitable mouth-wash, will be found sufficient to relieve the patient very speedily. General blood-letting, and the other severe measures of a like kind which were formerly so much resorted to, are neither necessary nor desirable.

As a wash or gargle, while the inflammation is in its acute stage, there is nothing better than simple warm water or poppy fomentation. Subsequently dry, powdered alum may be dusted on the tongue, or a lotion of alum, or chlorate of potash, or borax, may be ordered with great advantage. As a change a mouth-wash containing dilute nitric, hydrochloric, or acetic acid may be prescribed; but these, if long continued, are hurtful to the teeth, by dissolving their earthy constituents, and making them prone to decay. The most suitable tonics are ammonia, iron, quinine, and the barks.

If an abscess occurs far back in the tongue, and if the surgeon can localize the collection of fluid with sufficient accuracy, he will be right in making an incision with a view to its evacuation. If pus is set free, the patient will experience immediate relief, and under appropriate management the disease will soon be cured. In making an incision the surgeon should bear in mind the position of the principal arteries which supply the tongue; but when the organ is swollen there is not much fear of wounding them. Even a slight and perfectly safe incision will usually be followed by free bleeding. This, however, will be beneficial to the patient, and need not cause the surgeon any apprehension. If the abscess is deeply situated at the root of the tongue, the best plan is to divide the superficial tissues with a scalpel, and then thrust a director into the organ, towards the spot where it is believed the collection of matter will be found. If pus escapes, the puncture may be enlarged in the direction which is most likely to avoid the main vessels.

As regards the subsequent treatment, the patient should be ordered to rinse his mouth frequently with tepid water, or warm lotion, or with a disinfecting wash; to live entirely upon soft food, and to avoid speaking. Some aperient medicine should at the same time be prescribed, and this should be speedily followed by tonics. If there is reason to suspect a venereal taint, the iodide of potassium should be given in combination with steel, quinine, or ammonia.

If, as sometimes happens, the abscess fills and refills after it has been lanced, a couple of silk threads may be passed

through it, in the form of a seton, with the object of bringing about its contraction and permanent closure. A case in which this was done with success is related in the "Lancet" for May, 1833.

In simple ulcerations the attention of the surgeon should be early directed to the digestive organs; and, after a cholagogue and purgative has been given, a course of alterative medicine should be ordered, to be followed by stomachics and tonics. Arsenic sometimes acts like a charm in these cases. Whatever dyspeptic symptoms are present must be met by their appropriate remedies. To consider in detail all the varieties of such symptoms would carry me beyond my proper limits. It may be sufficient if I say that the dilute hydrocyanic acid, bismuth, chlorate of potash, and bromide of potassium will be found of special value.

As a local application to ulcers, whether simple or specific, there is nothing better than the nitrate of silver, or the sulphate of copper, either in the solid form or in solution; but care must be taken to apply the caustic in moderation, and with judgment, so as to destroy the morbid tissue without increasing the general irritation. The lunar caustic diluted with nitrate of potash, which is used in ophthalmic practice, is well adapted to effect this object.

As a mouth-wash the most suitable is lime-water, or chlorate of potash (ʒj or ʒiiss to a pint of water); or the patient may be desired to suck the trochisci potassæ chloratis, or the trochisci bismuthi. In all ulcerated conditions of the tongue, more particularly in those which are of malignant origin, it is often agreeable to the patient

to hold in his mouth the finely-grated pulp of a earrot. This is a recipe which has long been in vogue. A plateful may be placed by his side, and he may be allowed to change it as often as he pleases. It forms a smooth, cleansing, soothing application to the ulcerated surface, and it has the further advantage of keeping him from talking.

Of the treatment of syphilitic ulceration I shall speak at length in the next chapter.

CHAPTER VIII.

SYPHILIS, AS IT AFFECTS THE TONGUE.

THE tongue is one of those parts of the body where the so-called secondary and tertiary stages of syphilis are most prone to show themselves, and the symptoms of the disease are here remarkably protracted and persistent.

We may naturally inquire why this organ should be a favourite seat for the manifestation of the later phenomena of syphilis. Probably the reason is that it is so vascular, and in such constant activity. The most scientific way of regarding syphilis is that it is an exanthematous disease, whose stages are very long, and whose march is very slow. It depends as clearly upon a definite blood-poison as small-pox or scarlatina, and this virus manifests itself most conspicuously in certain organs and parts, which are highly supplied with blood, and whose functional activity is great—*e.g.*, the skin, the iris, the pharynx, the soft palate, and the tongue; and, among internal parts, the brain, the liver, and the spleen.

Of the various diseases which affect the tongue syphilis is the most common. Thus I find that five-ninths of the cases of tongue disease I have noted were of this nature.

The chief syphilitic affections of the tongue may be ranged under the following heads:—

1. Mucous tubercles and vegetations.

2. Superficial ulcerations.
3. Gummy tumours and deep ulcerations.
4. Morbid conditions of the mucous membrane.

These are, as I have said, the chief syphilitic affections that are met with in the tongue, but they are not the only ones. Primary sores are occasionally seen in this situation. Thus out of 824 chancres, whose site was noted by M. Fournier, 6 were on the tongue. In various ways—by direct contact, as in kissing, by means of spoons, tumblers, cups, and the like—the secretion from secondary sores about the lips of one individual may be conveyed to the tongue of another, and there give rise to a primary sore. In such a case the sore presents the characteristic appearances of a Hunterian chancre, leads to enlargement of the glands beneath the jaw, and so on to constitutional infection.

Happily these cases are rare, and it is not necessary for me to dwell upon them at greater length. I shall, therefore, pass on to those which are of a secondary and tertiary kind, and which are of much more common occurrence.

1. Among the earlier symptoms of constitutional syphilis, as it affects the tongue, we sometimes see circumscribed elevations of the mucosa exactly analogous to the mucous tubercles which are so frequently observed in other situations. These mucous tubercles are generally met with about the sides and under surface of the tongue, or on the fold of mucous membrane which is reflected from the tongue to the floor of the mouth; and they have been noticed to co-exist with mucous tubercles about the anus, the labia, and other parts. Sometimes these mucous tubercles are broad, flat, and of a pale, whitish colour (*condylomata lata*); at other times they

are small, prominent, and florid, having more the character of vegetations (*e. acuta*). In the former it is chiefly the epithelium which is increased, in the latter the papillæ; but both elements are more or less affected in both. These condylomata may be diagnosed from the epithelial or papillary growths, which are frequently the first indications of cancer, by observing the absence of induration at their bases, the freedom from pain, and the chronic character of their progress. In the great majority of cases there will be found co-existing symptoms of syphilis in other parts of the body. In severe cases of ulceration we sometimes see that the mucous membrane towards the back of the tongue is unusually rough, and raised into a number of eminences, each about the size of a split pea. This is a condition which is particularly apt to show itself about the centre of the dorsum, in the area formed by the circumvallate papillæ. These elevations consist of a thickening and induration of the mucosa, and are essentially of the same character as the mucous tubercles to which we have just alluded. This appearance is well seen in Figures 22 and 25.

2. Few persons who are affected with constitutional syphilis pass through the secondary period without some superficial tenderness or ulceration of the tongue. This form of ulceration is generally met with in the anterior half of the organ. Its most common seat is on the sides, tip, and under surface, and it is often associated with similar ulcerations upon the inside of the cheeks, the lips, and about the angles of the mouth. It begins as a small inflamed spot, or as a vesicle. From this commencement it extends in linear cracks and fissures (rhagades). These

cracks and fissures are very analogous to those which are frequently seen in syphilitic affections of the skin, more particularly in the neighbourhood of joints, and are no doubt determined by the folds into which the tongue naturally falls during movement. These cracks and fissures are exquisitely sensitive, though their character is indolent, and there is little vascularity in or around them. The least touch causes the patient acute pain ; and, as it is very difficult to keep the tongue at rest, they are a constant source of suffering and annoyance.

When the superficial ulceration heals the texture of the mucous membrane is found to be altered, and the tissue has lost its normal characters, both anatomical and functional. Sometimes depressed cicatrices are formed, which give the affected part a rough, corrugated appearance. Sometimes, on the contrary, the cicatrix is smooth and shining. In other cases again the papillæ adjacent to the scar become hypertrophied, the epithelium is not shed as it ought to be, and accumulates in the form of raised, milk-white lines or patches. The functions of the affected part are impaired. Both sensation and taste are blunted. The patient feels as if his tongue had been scalded, and there are in the neighbourhood congested and tender patches, which seem on the verge of fresh ulceration.

The milk-white scars that have been mentioned are very characteristic of syphilitic ulceration. They consist of fibrous tissue, and an excessive development of epithelium, the scales of which have become tough and sodden from constant immersion in the fluids of the mouth. These cicatrices are very persistent, and often tell a tale of bygone

disease long after its active manifestations have ceased. At other times they co-exist with present ulcerations in other parts of the organ. The most remarkable case of this kind that I have ever seen was that which I have already described at p. 97. Here the ulceration had been so extensive, and the overgrowth of epithelium was so great, and so persistent, as to amount to the condition, which, for lack of a better name, we call *ichthyosis*.

Sometimes the ulceration, though remaining superficial, is not confined to fissures and cracks, but spreads into large circular or oval sores. Thus we not unfrequently see syphilitic ulcers on the sides and under surface of the tongue, especially in the neighbourhood of the frænum, which are of considerable size, with well defined edges and a hardened base. They have the same general characteristics as the specific ulcers that we are familiar with on other mucous membranes, and on the skin. They are apt to be determined by some local cause of irritation, just as is the case with simple ulcers in an unaffected constitution. In fact, they may be regarded as simple ulcers, modified by the venereal taint, and this modification consists chiefly in the absence of acute inflammation, unless it be accidentally produced, and in the chronic course of the disease, which gives rise to the characteristic callous edges and indurated base.

After a superficial ulcer has quite healed, there remains a cicatrix in which the papillary structure of the mucosa has been destroyed, and which may be easily recognised by its smooth, shining appearance.

3. So much for the superficial ulcerations of the tongue which are due to the syphilitic virus. I now turn to

the deep-seated affections which arise from the same cause. These have in their commencement the character of new formations, and consist of cell-growths of low organization. The depth at which these tumours are found varies considerably. Sometimes they are just beneath the mucous membrane; while in other cases they lie in the centre of the muscular substance of the organ. Their most common situation is in the fibrous raphé which divides the tongue into two symmetrical halves. This septum is thicker behind than in front, and it is in the middle and back part that the syphilitic tumours are most frequently met with. When deposits take place in the fibrous septum they are usually hard and dense, and have the character of nodes. When they occur in other parts their precise seat appears to be the areolar tissue, and here they present the soft, cellular characters of gummata. In short, the syphilitic deposits, which are found in the tongue, vary somewhat according to the tissue in which they occur, and exhibit the same differences in their intimate structure as syphilitic cell-growths in other parts of the body. In speaking of the general characters of these varieties of syphilitic deposits, Dr. T. Henry Green says:—

“There is a certain class of new formations which have been described by Virchow as ‘granulation tumours.’ They consist in the first place of granulation tissue; this becomes very incompletely organized into a fibrous structure, and many of the elements at the same time undergo retrogressive changes, so that the growth is ultimately made up of atrophied, degenerated, and broken-down cell-products, embedded in an incompletely fibrillated tissue. These are the growths which are most characteristic of syphilis, and

they are known as *gummata* or *gummy tumours*. They are closely allied to chronic inflammatory growths on the one hand, and to the small, round-celled sarcomata on the other. Although the gummata are the new formations most characteristic of syphilis, all syphilitic growths cannot be included under this head. A simple fibrous growth is as frequently the result of the syphilitic poison as a true gummy tumour, although as evidence of syphilis it occupies an inferior place. The two, however, are so frequently associated that in many cases it becomes difficult to draw a sharp line of demarcation between them; a formation which in its early stage is simply young connective tissue, may subsequently assume either in whole, or in part, the characters of a gummy tumour."—"Pathology," p. 118.

These tumours, as has been said, are apt to degenerate; and, when they do so, they form a soft, semi-fluid material, which may either become absorbed, or make its way slowly towards the surface. Occasionally they undergo a calcareous change.

Schenck of Grafenberg refers to a man who lost his speech "*ex nascente intra linguam lapide*," and recovered it again when the stone was taken away. Though the learned author gives no particulars, he clearly distinguishes between this disease and ordinary salivary calculus. (Schenck, "Obs. Med. Rar.," I. i. 182, 1644.) In the 20th volume of the "Philosophical Transactions" (1698), the case is related of "a stone bred at the root of the tongue." The patient could hardly swallow on account of a tumour at the base of his tongue on the right side. After a time this broke, and discharged a quantity of matter, and with it a

stone which weighed seven grains. Probably in both these instances the calculi were calcified gummata. These are the only examples of the kind that I have met with in the records of tongue disease. I have failed to find anything of a similar nature in more recent medical literature.

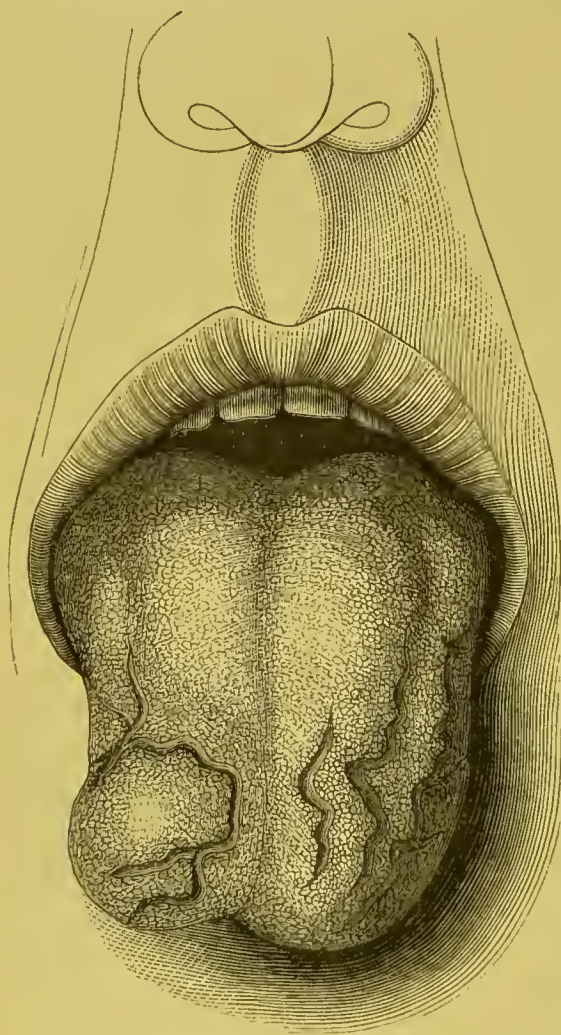


FIG. 23.—Syphilitic nodule and fissures.

The simplest and commonest of the syphilitic deposits found in the tongue, are about the size of a pea or small bean, situated in the median line, near its middle or posterior part. They are hard and nodular. The mucous membrane covering them is unbroken, smooth, and shining. In some cases the tumour is elevated; in others it is depressed, having by concentric contraction drawn the soft tissues down to itself. These no-

dules may exist for a length of time, without either being resolved or showing any tendency to break down. Under appropriate treatment they undergo a gradual absorption.

I have just said that in some cases the soft tissues are drawn down by a process of concentric contraction until a little pit or depression is formed. These two stages—cell-growth, and subsequent contraction resulting from absorption

or discharge—we frequently have occasion to notice, and we often see marked traces of them in the fissured tongues which are so characteristic of syphilis. Fig. 23 will help to illustrate this point.

Here there was a nodule, about the size of a bean, in the right half of the patient's tongue. The adjacent tissues had contracted in such a way as to curve the organ upon itself, and both sides were deeply fissured. This

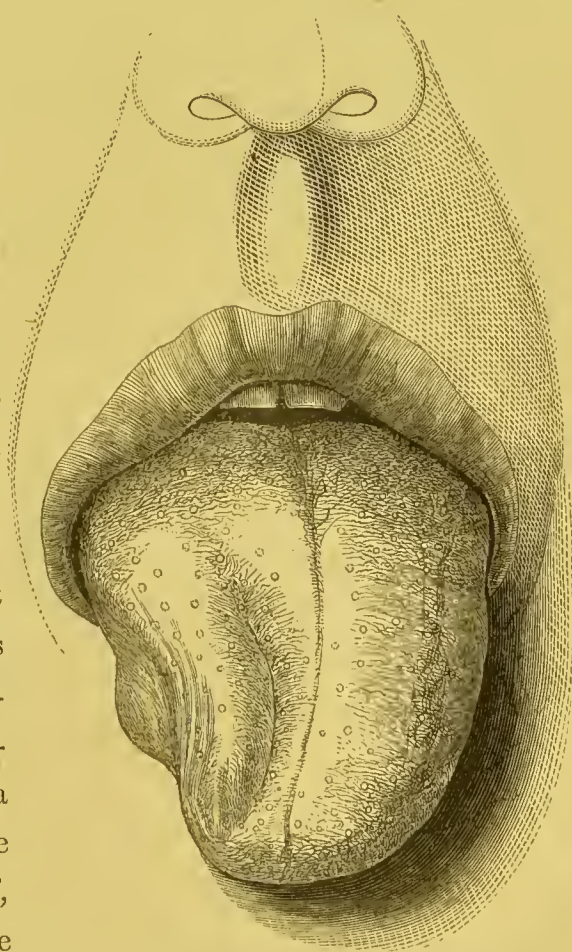


FIG. 24.—Fissure after absorption of a syphilitic tumour.

man applied to me in the first instance for syphilitic iritis; and on examining his tongue I found the appearances that I have attempted to depict.

In the case from which Fig. 24 was drawn there had been

a nodule in the right half of the tongue, which had been watched by the medical man, who sent the woman to me. But at the time I saw her there was no hardness to be felt. There was, however, the deep fissure I have indicated; and some milk-white sears were visible on the right side. She was suffering also from several other manifestations of syphilis—sore throat and loss of voice, anal mucous tubercles and specific ulcers on the legs.

Fig. 25 (frontispiece) represents a case in which the tongue was much more deeply fissured, but in which there were no nodules at the time the patient came under my care. He had, however, had syphilitic symptoms for many years, and there had been in his tongue, as he said, "lumps and a discharging hole." But the nodular stage had passed, and there remained only the fissures resulting from absorption or disintegration, and subsequent contraction.

It may be asked, are we to regard all cases of fissured tongues as of syphilitic origin? Before I answer this question let me point out the distinction between a fissured and a wrinkled tongue, for to the superficial observer their appearances are sometimes very similar. A fissure goes deeply into the substance of the organ, but rugæ are confined to the mucosa. They are mere folds in it, and go no deeper. This may be demonstrated at once by taking the tongue between the fingers, and gently stretching it. The rugæ can be obliterated with the greatest ease, while no impression is produced on the fissures. Their sides may be separated, but they cannot be obliterated. Almost every tongue presents some wrinkles and folds in its mucous membrane. These may be very marked, if the patient's

health has been such as to produce a temporary enlargement, with a subsequent diminution, in the size of the organ.

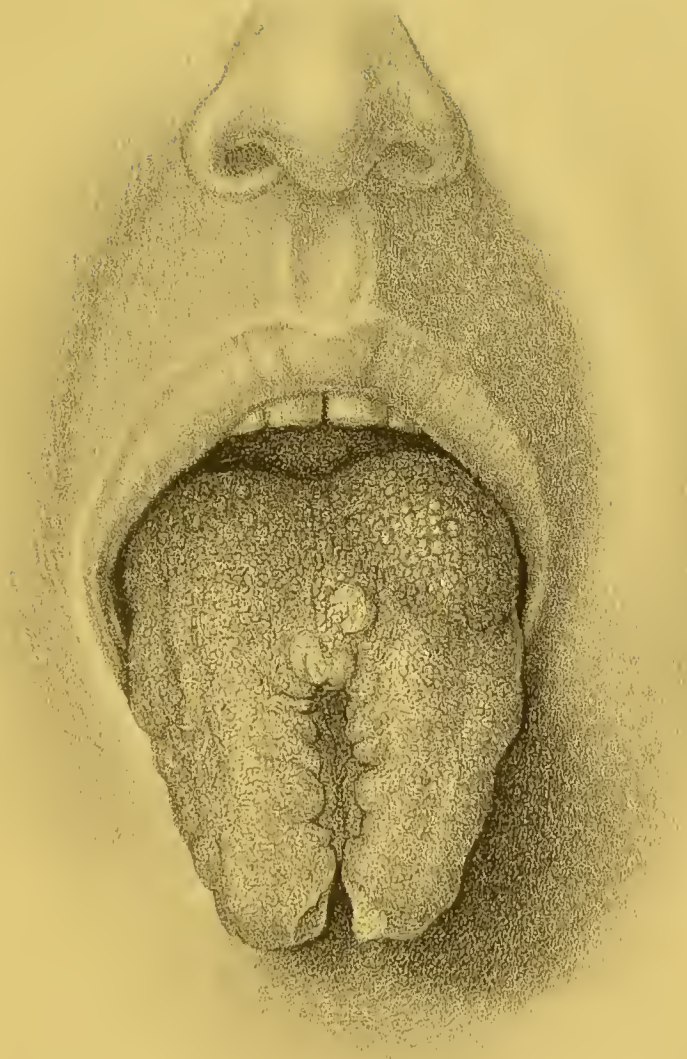
Thus a period of indigestion or debility may give rise to a pale and swollen tongue—a tongue which readily takes the impression of the teeth. But when a better state of the general health is brought about, when the muscular fibres recover their tone, the stretched mucous membrane falls into folds, and it is some time before this condition passes away, and the organ resumes its natural firmness. A rugous tongue is, therefore, a very simple affair, and may be the result of nothing more than a little dyspepsia. But, as far as my experience goes, the vast majority of fissured tongues are due to syphilis, and are characteristic of the later stages of that disease.

It is true that in some instances the fissure may arise from the absorption of a serofulous or tuberculous deposit, or it may be associated with elephantiasis græcorum, or it may be the result of injury; but such cases are comparatively very rare, and do not invalidate the general conclusion which I have drawn.

But it is not merely the natural folds and wrinkles of the tongue which are liable to be mistaken for fissures that result from disease. Other marks upon the organ may in other cases deceive the surgeon. On minute inspection it is found that one tongue differs much from another, and among these differences we often see peculiar marks, which are not unlike the traces of bygone disease. It is necessary, therefore, to be very exact in our scrutiny, if we would avoid being misled by superficial appearances.

But to return from this digression. The syphilitic tumours do not always undergo absorption, or even remain inert. Frequently they break down and soften, as nodes or gummata in other situations are apt to do. When fluid has once formed, it makes its way to the surface, and finds a vent for itself on the dorsum of the tongue. If at this stage appropriate treatment is adopted, the case may proceed as an ordinary abscess, and speedily heal. But if, unhappily for the patient, it is neglected, the orifice by which the discharge has taken place rapidly ulcerates, and in a few days there may be a deep and foul excavation. A woman who had a large gummatous tumour in the middle of her tongue, applied to me just after it had relieved itself by three longitudinal gashes. She had previously been a patient at the hospital. There was a clear syphilitic history; so I at once put her upon a specific plan of treatment, and her tongue, which was swollen and livid at the time I first saw her, soon returned to its natural size and appearance, and the openings gradually closed.

The patient whose tongue is represented in Fig. 26, had long been the subject of syphilis, and when she first came under my notice her tongue was in the condition depicted. I have no doubt that there had originally been a deposit in the usual situation—that is to say, in the fibrous septum about its middle. This had softened down and broken, and subsequent ulceration had taken place. This ulceration had followed the line of the raphé—the line of feeblest nutrition—and so deeply had it extended that for about half an inch at the tip it had divided the tongue into two portions, and given it the bifid



W.F.C. del. E. Burgess lith.

W. West & Co. imp.

Deep Ulceration (syphilitic)

Fig. 26.



appearanee that is indicated in the drawing. As this case illustrates the peculiar features of deep syphilitic ulceration, it may be well to mention some particulars respecting it. The patient was a woman, aged twenty-six, whose home was in the country, a short distance from London. She had originally had a good constitution, but was now deeply infected with syphilis. For some months I tried to cure her as an out-patient, but in vain. Her husband was a chronic invalid, unable to do any work, and at home she had not the necessaries of life. Accordingly she was received into Charing Cross Hospital, and then an immediate improvement manifested itself. At the end of two months she was discharged, the ulceration of the tongue having quite healed. Her stay in the hospital was prolonged by an attack of pleurisy, and by the suppuration of a gland about the middle of the neck on its left side. A couple of months later she returned as an out-patient, looking thin, pinched and hectic, and complaining of constant sharp pain in the right side of the chest. Her pulse was high and irregular, and her respiration three times as fast as natural. In the left centre of her tongue, on the inner edge of the swelling represented in the drawing, was a small, deep, excavated ulcer, with irregular and inflamed margins. It was evident that a gummy tumour in that situation had softened and burst. There was also an enlarged gland, the size of an almond, at the angle of the left jaw. The back of the tongue was tender and painful ; but the anterior part remained quite sound. As soon as arrangements could be made, she was again admitted into the hospital. Here she was kept in bed, ordered to

abstain from talking, put upon a diet of milk and beef tea (*ad libitum*), and allowed ʒij of port wine *per diem*. Turpentine stupes were applied to her chest, and she was directed to take a mixture containing ammonia, spirits of chloroform, and paregoric, in camphor julep. Under this treatment the acute pain in the side soon subsided, the ulcer in the tongue began to improve, and the enlarged gland diminished in size. Her medicine was now changed, and she was ordered iodide of potassium (gr. 3), with tartrate of iron (gr. 5), three times a day; and ten drops of chlorodyne every night at bedtime. Of the beef tea she soon grew tired; the port wine she begged to be allowed to discontinue, as it made her tongue smart; so that, with my concurrence, her diet was confined to milk. Under this treatment great improvement took place. The deep ulcer filled up, and healed; the enlarged gland gradually disappeared; the old cleft in the tongue showed no disposition to reopen, and at the end of three weeks she left the hospital perfectly well.

It is a remarkable fact, which is well illustrated by the case I have just related, that the tongue may be extensively ulcerated while the palate and uvula remain unaffected: and conversely, that the palate and uvula may perish from syphilitic ulceration, without the tongue participating in any degree in the diseased condition. It appears almost as if an affection of the one tract were antagonistic to an affection of the other.

I have seen deep syphilitic ulceration of the tongue in connection with "laryngeal phthisis," and in such a case the question naturally arises how far the laryngeal symptoms

may be due to the syphilis, and how far to the phthisis. It is not improbable that both diseases take part in their production. The lung disease puts the trachea and larynx into a congested and irritable condition, which is favourable for the local development of the constitutional syphilis. In such a case, if the general state of the patient does not forbid, the iodide of potassium ought to be cautiously tried, its lowering effects being carefully watched. Much benefit sometimes results from thus checking one of the evil influences which are at work.

In comparatively few of the syphilitic cases of tongue disease which I have seen were the lymph-glands beneath the jaw enlarged or indurated. Indeed, these secondary and tertiary affections are usually of too chronic a kind to produce marks of irritation in the lymphatic system. In the case of primary sores on the tongue there will, as I have said, be glandular enlargement. Sometimes, when there is a severe superficial ulcer, or when a gummatous tumour softens, breaks, and subsequently ulcerates, a deep, foul ulcer with active inflammation may be the result; and this ulcer, like a cancerous one, may affect the neighbouring lymphatics. But the large class of cases intermediate between these two extremes is not prone to give rise to glandular indurations.

Cases such as I have described, in which there is an excavated ulcer with thickening of the surrounding tissues, enlargement of the adjacent glands, and general syphilitic cachexia, are sometimes very difficult to distinguish from cancer, and call for the most careful study on the part of the surgeon.

This leads me to the consideration of a very important question:—Can syphilitic ulceration pass into cancerous ulceration? I have no doubt that it can. If simple ulceration may become cancerous—a thing about which there seems to be no difference of opinion—*à fortiori*, I should say, may syphilitic ulceration. The transition from a syphilitic to a cancerous sore takes place in two ways. In some cases the syphilitic ulcer seems to become gradually malignant—the cancer arising, as it were, from the dregs of the syphilitic disease. In other cases the scar left after the healing of a syphilitic sore appears to form the starting point of an epithelioma.

It is mucous tubercles on the one hand, and the deep syphilitic deposits on the other, which are most likely to be confounded with malignant disease. Speaking generally, cancers are more warty, more suddenly upraised at their edges, than the mucous tubercles. They are also more frequently accompanied by induration, which extends far into the substance of the tongue. They are, too, more vascular, more acute in their course, and, from an early date, they are attended by pain, not merely at the seat of disease, but also about the jaw and ear. As compared with the deep syphilitic deposits it may be noted that the mucous membrane over a cancer is rough, and the papillæ are somewhat hypertrophied; the mucous membrane over a syphilitic tumour is smooth and shining. The cancer, too, tends towards the root and deeper parts of the tongue; the syphilitic deposit makes its way to the surface.

As it is of the first importance to distinguish the two diseases—syphilis and cancer—in their early stages, I shall

now give a tabular view of the points which ought to be taken into consideration in arriving at a diagnosis. It is not, of course, to be expected that each of these signs will be equally well marked in every instance. They must be viewed comparatively, and balanced one with another. If this is done, the cases about which any serious doubt can remain, at least after the patient has been seen two or three times, will be very few.

Differential Diagnosis of Cancer and Syphilis, as they affect the Tongue.

CANCER.	SYPHILIS.
Generally over age of 40.	Generally under age of 40.
Begins at one side, generally at middle or posterior third.	Frequently in central line.
Shape circular.	Shape oval or oblong.
Pain acute and darting.	Pain slight or none at all.
Ulceration secondary— <i>i.e.</i> , the induration becomes ulcerated.	Ulceration primary — <i>i.e.</i> , the ulcer becomes indurated.
Tongue tied down and immovable.	Tongue free and moveable.
Speech thick and indistinct.	Speech easy and distinct.
Glands soon become enlarged.	Glands not affected.
Frequently attended by sloughing.	Never sloughs.
Increases steadily; sometimes rapidly.	Increases slowly; or remains stationary.
No amendment under treatment.	Amends under treatment.
Family history of cancer.	Syphilitic history and symptoms.

Where so much doubt exists that nothing must be neglected which can possibly throw light upon the case,

valuable aid to diagnosis may occasionally be obtained by seraping off a portion of the surface of the tumour, and submitting it to microscopical examination.

Before leaving this subject I may mention that tumours are sometimes seen in the tongues of children which are evidently due to inherited syphilis. Such tumours may break down, and ulcerate, and present very formidable appearances. It may be difficult to distinguish these deposits from those which are the result of struma; but this is of no great practical importance, for in either case the treatment must be conducted on the same general principles.

4. I now come to the fourth form in which syphilis affects the tongue; namely, by producing morbid alterations of the mucous membrane. The functions of the organ are but little affected, the muscular movement is not impaired, but the mucosa undergoes some important changes.

The simplest of these I have already alluded to in speaking of *psoriasis linguæ* (see Fig. 21). Here the epithelium over a circumscribed area is slightly increased in quantity, and presents a dead-white appearance. The papillary structure is obliterated, but the patch is traversed by a few delicate markings. It is said that this morbid condition may be brought about by a variety of causes; but in the great majority of instances I believe it is due to syphilis. After a day or two the accumulated epithelium is shed, either in scales or in minute particles, and a red, raw surface is left. If judiciously treated the epithelium may be speedily re-formed, and all may be well. But if the complaint is neglected, it may persist for a length of time, one

patch succeeding another ; or it may even form the starting-point of superficial ulceration.

There is another, and a much more extensive disease of the mucous membrane, which has been variously named by different writers, but which I have termed *chronic superficial glossitis*. This is the name which Dr. Copland gives it, and his description tallies more closely with my own observations than any other that I have seen. But by whatever name it is known, it is a late and a very persistent manifestation of the syphilitic taint, and one of the most obstinate affections to which the tongue is liable. It has been said that a similar condition of the investing membrane is a common accompaniment of scurvy, and I do not doubt that it may arise from any of those causes which impoverish the blood, disturb the digestion, and impair the nutrition of the mucous membrane. But it has not happened to me to meet with it under these circumstances ; and my own experience convinces me that in the great majority of instances it is closely associated with syphilis.

This superficial inflammation of the tongue has been aptly compared by Mr. Langston Parker to that which we see in the glans penis in balanitis. At the commencement of the disease some portions of the membrane present their natural appearance, while others are of a deep red colour, and raw-looking. These patches are generally more or less oval or oblong.

Their surface is smooth and glossy. They are either entirely denuded of epithelium, or it is reduced to an extremely thin layer, and the papillæ are obliterated by

distension. They are somewhat elevated and hard to the touch, in consequence of interstitial thickening. The French writers have described them under the name of *plaques muqueuses*. The tongue is large and swollen. At the edges it takes the impression of the teeth very distinctly, and the lines thus produced are prone to ulcerate. Indeed it is no uncommon thing to see superficial ulcerations on such tongues; but these ulcerations are caused by the breaking down of the disorganized mucous membrane, and are brought about in a somewhat different way from those which occur at an earlier date in the history of the disease. Sometimes the whole organ has a bluish, congested hue, as if its circulation were retarded in consequence of the matted and thickened state of the tissues. The mucous secretion all over the affected portion of the tongue is viscid and glairy, giving the organ a peculiar, smooth, glazed appearance; and sometimes the patient's breath is so foetid that he is offensive to himself and to all about him. He complains likewise of thirst; his mouth is parched, especially at night; and when he wakes in the morning, his tongue feels dry and chipped. The disease is in fact a chronic glossitis, limited to the mucous membrane, and affecting chiefly the marginal parts of the tongue.

If this state of things goes on the mucous membrane of the whole tongue may become altered in character, and present the condition that has been described. I have seen a case in which there was none of the healthy mucosa left in the anterior two-thirds of the organ. Supposing the more active mischief to be checked, the swelling subsides,



E. Burgers, de Let lith

W. Wess & Co. imp

Chronic superficial Glossitis
Fig. 21.

and the tongue resumes its normal size—indeed it may become smaller than natural, and rather misshapen from the irregular contraction of the diseased parts; but the membrane never recovers its healthy character. The patches that have been affected remain smooth and shining. The papillary structure has been impaired, and what is left is in fact cicatricial tissue; a tissue which is exquisitely sensitive to the contact of hot, acid, or pungent substances, and which is apt to become inflamed from very slight causes. At a still later date portions of this cicatricial membrane become fibrous, presenting a whitish appearance, and being callous to the touch.

The patient from whom Fig. 27 was drawn, was a married woman, aged thirty-seven, whose history gave evident indications of a syphilitic infection. When she applied to me, her tongue had been sore for eleven years. It was much swollen, and showed the impressions of both rows of teeth in a remarkable way. Where it came in contact with the teeth, it was superficially ulcerated in many places. On the dorsum were several red patches, smooth, glossy, and slightly raised. They were bald, as if the epithelium had been thinned or shed, and the papillæ opened out by distension. The rest of the organ had a livid hue. The gums, the angles of the mouth, and the inside of the lower lip were much ulcerated.

This condition, as I have said, is generally seen in persons who have long been affected with syphilis; and the question will sometimes arise whether it is due to the disease, or to the prolonged use of the drugs by which it has been combated. Syphilis is so prone to manifest itself in the tongue,

that I cannot doubt that in some cases the appearances I have described are entirely produced by it—possibly by syphilis in association with dyspepsia. When a patient has the venereal taint in his system a very small amount of gastric or intestinal disturbance will suffice to irritate and inflame the tongue. Such an attack as this, the result of latent syphilis called into activity by an embarrassment of the digestive organs, will occasionally show itself long after all the earlier symptoms have passed away. In one of my cases the interval was sixteen years. In one of Dr. Hyde Salter's, fifteen years. But in other cases—particularly in those which are attended by fœtor, and an alteration in the mucous secretion—I feel sure that they have been aggravated, if not caused, by over-treatment.

In some individuals, iodide of potassium inflames the mucous membrane of the tongue—just as in others it affects the nose, eyes, and frontal sinuses—and produces a redness, tenderness, and swelling, with over-growth of the papillæ, and an increased flow of saliva. Mr. Langston Parker mentions a singular case bearing upon this point. A surgeon consulted him on account of a suspicious skin disease, for which he had attempted to take the iodide of potassium; but whenever he used it for two or three days solid lumps, like tubercles, made their appearance on his skin and tongue, and the latter organ became so large and painful that he was obliged to give up the remedy. (“Modern Treatment of Syph.” 5th ed., p. 276.) Strange to say, while it is producing this baneful effect upon the tongue, it may be exercising a beneficial influence upon other symptoms, and removing cutaneous eruptions, or nodes. Thus the surgeon

may be induced to continue a remedy which ought either to be laid aside altogether, or reduced in quantity. In one of my cases a tongue which had been affected with chronic superficial glossitis for six years, and was now quiescent, immediately became worse on the administration of five grains of iodide of potassium three times a day.

That mercury may affect the tongue in a similar way is well known. Cases of acute mercurial glossitis, such as I have elsewhere related, used to be not unfrequent. Happily they are now rare. Still there is reason to believe that some individuals are so susceptible to the effect of this drug that even very mild doses may be sufficient to keep up a chronic irritation of the mucous membrane of the tongue, and thus to lead to permanent changes in its texture. The symptoms I have described so much resemble those which are seen in slight cases of mercurial glossitis, unassociated with syphilis, that one cannot help fearing that they may be due, at least in part, to the medicine which has been given for the relief of other symptoms.

In some cases a course of iodide of potassium may dissolve mercury which has been taken long before, and which has formed an insoluble compound with the albumen of the tissues. Thus the superficial glossitis may be due, not to the iodide of potassium, but to the mercury, which is once more brought into the current of the circulation. Supposing it to arise in this way, if the quantity of mercury previously taken has been small, it may be speedily and completely eliminated from the system through the kidneys, and then the glossitis will subside. But if the quantity

has been considerable, the administration of the iodide of potassium will only increase the mischief.

Mr. Langston Parker, whose experience in the treatment of venereal diseases was very great, was strongly of opinion that the morbid conditions of the tongue, of which I am now speaking, were entirely due to the excessive use of iodide of potassium or mercury—the iodized and mercurialized tongues, he calls them; and he has adduced some striking cases in support of his theory. I believe, however, that the causes which produce and maintain superficial glossitis are more complex, and that, at least at the present day, it is rarely that it owes its origin altogether to either mercury or iodide of potassium. But since these drugs are undoubtedly liable to act on the tongue, it is always well before prescribing them to examine the mouth carefully. If any stomatitis be present, it may modify our opinion with regard to the use of mercury; while, if the state of the tongue and gums is perfectly natural, it may enable us accurately to estimate its effects. During the whole course, the same strict examination of the interior of the mouth should from time to time be made.

In a severe case of *purpura hæmorrhagica* I have seen bright-red patches upon the tongue, which, on a superficial observation, were not unlike those that I have just described as being associated with late syphilis. But they differed from them in that there was no structural alteration of the mucous membrane. The surface was not bald. The papillæ and the epithelium were normal, only a circumscribed patch was of a deep red colour. Froriep, in his interesting

work on the anatomy and semeiology of the tongue, has given a drawing of these hæmorrhagic spots.

All the leading forms of syphilitic disease, as it affects the tongue, are well illustrated in the beautiful series of drawings and models which were lately presented to the Royal College of Surgeons by Mr. Erasmus Wilson.

With regard to the treatment of the syphilitic affections of the tongue, it is of great importance that the organ should have rest. To secure this object the general directions which I have given when speaking of inflammatory and ulcerative diseases should be enforced.

As regards the so-called "specific" drugs, it is my habit to use small quantities of mercury, and moderate doses of iodide of potassium—from fifteen to thirty grains in the course of the day. These medicines may be employed either singly, or simultaneously, or in combination, as the circumstances of the case seem to indicate. But, whether one or both are prescribed, it is essential that they should be taken regularly and continuously for a length of time. The great majority of these syphilitic affections are of a kind which show that the system is saturated with the venereal poison, and we must not expect that it can be easily or speedily eliminated. It is an excellent plan to combine tonics with the antisyphilitic medicines. In hospital practice this adds very much to the good effect produced by the treatment, and materially assists in bringing about the result that we have in view. Unless the patient has a certain amount of *vis vitæ* he seems unable to resist and overcome the violence of the syphilitic poison. He ought,

therefore, to live well, to be warmly elad, and to be placed in favourable conditions when he is under a course of specific treatment. While adhering to the antisyphilitic medicines, it is well from time to time to vary the preparation in which they are given, always bearing in mind the necessity for supporting the general health.

With regard to mercury it is desirable, as far as possible, to avoid giving it by the mouth, and to use inunctions or fumigations by preference. These methods, though less convenient and cleanly, have the advantage of not disordering the digestion.

If inunctions are used a drachm of the unguentum hydrargyri should be rubbed on the inside of the thighs or arms every night, or half an ounce should be spread on a broad roller, and bound round the waist. If this latter plan is adopted, the bandage should be removed every two or three days, the parts washed with warm water, and fresh ointment applied. If the mercurial vapour bath is ordered, the apparatus devised by Mr. Henry Lee should be employed. It consists of a small spirit lamp, a tray, and a reservoir for water. Twenty grains of calomel are sprinkled on the tray, the reservoir is filled with water, and the lamp lighted. The apparatus is placed under a chair, on which the patient is seated, wrapped in a cloak. The water is boiled, and the calomel is sublimed; and thus a mercurial vapour is created, which permeates the pores of the skin. While either of these methods is being employed other medicines may, of course, be prescribed in the form of mixtures. If the patient's constitution is broken from any cause, mercury must be given with great caution; and if he

has disease of the kidneys, it should not be administered at all.

Among the preparations of mercury, suitable for internal administration, the most useful in syphilitic affections of the tongue are the hyd. cum cretâ, calomel, the red iodide of mercury, and the liq. hyd. perchloridi; but in some cases it may be desirable to give the pil. hydrargyri, or the pil. hyd. subchlor. co.; and sometimes Donovan's solution produces marked benefit.

As iodide of potassium has a depressing influence it is best administered along with a stimulant or tonic, such as ammonia, sarsaparilla, or quassia. Such a combination may tend to prevent "iodism." It makes a very efficient mixture with the tartrate, or ammonio-citrate, of iron. Sometimes it agrees best when given as the iodide of iron—*e.g.* a drachm of the syrupus ferri iodidi, either alone or in some bitter infusion, half an hour before meals. Though, as a rule, moderate doses of the iodide of potassium are sufficient, benefit may occasionally arise from increasing the quantity suddenly, and for a limited time.

If "specifics" have already been pushed too far, and the patient's health has given way under the combined effects of syphilis and of excessive doses of antisyphilitic remedies, the best plan is to lay aside altogether the mercury or iodide of potassium, and to adopt a sedative and tonic treatment. With this object it is well to order opium—especially Dover's powder—or hyoscyamus, or conium, or chlorodyne, or elhoral, or the bromide of potassium, in sufficient doses to quiet the system and procure sound sleep, while we prescribe tonics of various kinds, beginning

with the barks and mineral acids, and going on to steel, quinine, cod liver oil, and other restorative medicines.

With regard to local applications, in the case of superficial ulceration the best plan is to touch the surface of the sore with lunar caustic, while we place our chief reliance upon constitutional treatment. Sometimes, if the ulceration is spreading rapidly, a stronger caustic may be required, and then the surgeon should use nitric acid, or the liquor hydrargyri nitratis acidus. I have found painting the ulcers with black wash useful. While these applications are being employed, the patient may be desired to rinse his mouth frequently with a wash containing borax, or chlorate of potash; or to suck half a dozen of the trochisci potassæ chloratis in the course of the day.

For the cracked and fissured state of the tongue, washes of perchloride of iron, of tannin, or tannin and myrrh, or of borax and glycerine, or of chlorate of potash, may be prescribed with advantage. Paget recommends ʒj or ʒiiss of dilute nitric acid in a pint of water. Or the tongue may be painted with a strong solution of iodide of potassium (gr. 20 to ʒj), or with the glycerine of tannin. Any of these applications may help to improve the character of the mucosa, but they have no power to obliterate the fissures.

In treating gummy tumours, much may be done to promote their absorption by the use of iodide of potassium, or the perchloride of mercury. At the same time that one or other of these drugs is prescribed, conium, hyoscyamus, or some other soothing remedy, may be given with advantage. If, however, the gummata soften, break, and

ulcerate, they must be treated by the methods which I have already explained in speaking of ulceration, and upon those recognised principles which guide us in dealing with suppuration generally.

In the case of infants or children who have tumours in the tongue, whether they be due to congenital syphilis or to the strumous diathesis, our main reliance must be placed in alteratives and tonics; such, for example, as gray powder, and the syrup of the iodide of iron, or the *vinum ferri*.

With regard to the morbid accumulation and desquamation of epithelium, known as *psoriasis* of the tongue, the object of the surgeon should be to soothe the part, and allay the local irritation, so as to allow the epithelial covering to be normally reproduced. With this aim, if the epithelium has been shed, the patient should be directed to suck mucilaginous lozenges, and to take bland drinks. At the same time the surgeon must address himself to the constitutional state upon which the disease depends.

The swollen, tender, and patched condition of the tongue, which I have described under the name of chronic superficial glossitis, is best treated by the local application of solution of nitrate of silver (5 grains to the ℥j), or the glycerine of tannin; while iodide of potassium, arsenic, &c. are given with the view of improving the character of the mucous membrane. In those cases in which iodide of potassium can be borne, I have found more benefit from this drug than from any other.

If a patient has syphilis in his blood, the surgeon may find after lancing a simple abscess, or puncturing a cyst, or performing any other trivial operation, that the wound does

not heal as it should, that its edges become thickened and its base indurated ; and that, before it can be cured, the patient must go through a course of antisymphilitic treatment. These untoward results are particularly apt to happen if the patient is placed in unfavourable conditions—if he cannot, or will not, give his tongue rest, if he is suffering any of the privations of poverty, or if his health is much impaired.

CHAPTER IX.

CANCER OF THE TONGUE.

CANCER of the tongue is met with chiefly under two forms. Sometimes it shows itself as soft warty excrescences, which add considerably to the size of the organ. At other times it has a dense structure, drawing the tongue together into a hard mass, and rather diminishing its bulk. The latter was the variety of the disease which used to be called *seirrhus*; the former has gone by the name of *epithelioma* ever since it was first described by Hannover. But the minute investigations, which have accompanied the recent progress of pathology, have proved that any other form of cancer, except the epithelial, is extremely rare in the tongue; and, that even in those cases in which the disease is marked by an abundant admixture of fibrous tissue, the essential elements of the growth, as revealed by the microscope, are those of *epithelioma*.

Cancer of the tongue sometimes commences as a small elevated growth or vegetation; at other times as a blister or crack; or again, as a hard lump in the substance of the organ. But, in whichever of these ways it first shows itself, its origin may frequently be traced to some local irritation, such as the jagged edge of a tooth, or the smoking of a short clay pipe. Indeed there is no class of cancers

which affords a stronger argument in favour of the local origin of malignant disease. If we could follow them all up to their source, I have no doubt we should find that the great majority occur in tongues that are already damaged from some cause or another.

When cancer begins as a blister or crack, it speedily becomes indurated, and after the lapse of a short time an ulcer forms with ragged edges, and a foul secretion. When it commences as a vegetation, it usually goes on growing without ulceration till it reaches the size of a hazel nut, or a strawberry. It has a rough, villous surface, composed of hypertrophied papillæ. But sooner or later this surface breaks down, cracks and fissures form between the papillæ, and then the progress of the case is much the same as when the disease begins as a blister. Sometimes also the cancer commences as a hard lump in the muscular substance, and gradually invades the more superficial tissues, drawing them down to itself. Such a case may go on to its fatal termination with no ulceration at all, or perhaps only a little where the tissues have been most deeply puckered. It is these cases which used to be considered as examples of scirrhus. But it is now known that they only differ from the warty growths in having a larger admixture of fibrous tissue.

When cancer has once attacked the tongue, no matter what may have been the exact mode of its invasion, its march is characterized by symptoms which are common to all its varieties. There is occasional darting pain radiating toward the ear, temple, and vertex; the diseased portion is tender, eating is rendered difficult, speech is thick and in-

distinct, the base of the tongue becomes infiltrated, and the organ cannot be moved freely, or protruded; it seems as if it were bound down to the floor of the mouth. The sublingual and submaxillary glands, as well as those which are connected with the lymphatic system, become enlarged and painful. There is an increased flow of saliva. The circulation through the brain is disturbed, and the patient complains of giddiness and headache. The cachexia now becomes more marked. Rapid wasting and loss of strength manifest themselves. The local disease gradually involves more and more of the tongue. Sometimes large sloughs occur, in consequence of pressure upon the lingual artery or its branches, and profuse bleeding may take place. Sir William Lawrence relates a case in which the ulceration extended from the edge of the tongue to the tonsil, and fatal hæmorrhage occurred from the laying open of the tonsillar artery. The difficulty of swallowing, and even of breathing, is great, on account of the obstruction which the disease causes at the pharynx; and this obstruction is increased by œdema, the result of retardation of the venous current. Sometimes this œdema is so great that the tongue is protruded from the mouth, and cannot be retracted. Gradually the growth invades the neighbouring parts, and shows itself in the tonsils, the gums, or some other situation. Frequently there are affections of the air-passages—*e.g.* bronchitis or pneumonia; and the scene closes upon one of the most painful cases which it is the duty of the surgeon to attend.

The most frequent seat of cancer of the tongue is on the side of the organ, at its middle or back part. Though it

may manifest itself in any situation, it is seldom or never central in its origin.

If the mucous membrane is primarily affected, as in those cases which begin as vegetations, it will be found on minute examination that the papillary and epithelial elements are enormously increased. An overgrowth of these structures takes place also, to some extent, even in those examples in which the disease has begun as a hard lump in the muscular substance of the organ. These changes may be easily seen on ordinary inspection. If, after the removal of the disease, a portion of the growth, at the point where it is extending, be submitted to the microscope, epithelial scales, exactly

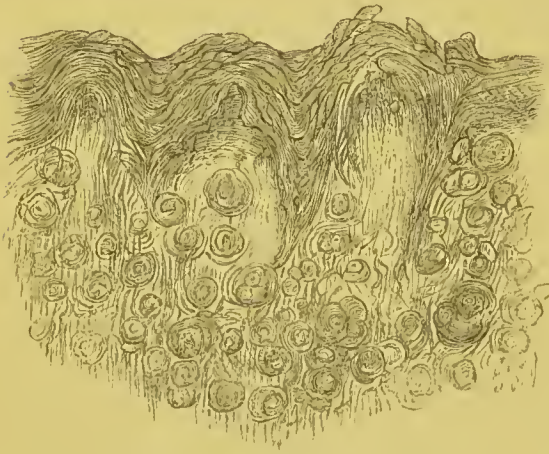


FIG. 28.—Epithelioma. $\times 100$.

like those which are met with on the mucous and cutaneous surfaces, will be found invading the submucous or muscular parts of the organ. (Fig. 28.) As these cells multiply, they arrange themselves in globular masses. The

outer cells of these masses become flattened by the pressure of the surrounding tissues, while those near the centre retain their expanded form. These are the laminated capsules, the concentric globes, or nests of cells, which are so characteristic of epithelioma. (Fig. 29.) In the older parts of the disease these globes will be found compressed into dense

masses in which no distinct cellular arrangement is visible ; while in the yet older parts they present only the appearance of granular debris in the interspaces of an abundant fibrous tissue. Figures 28 and 29 were taken from preparations which were kindly made for me by my colleague Dr. T. Henry Green. The ease from which figure 28 was drawn presented to the unaided eye the appearances of

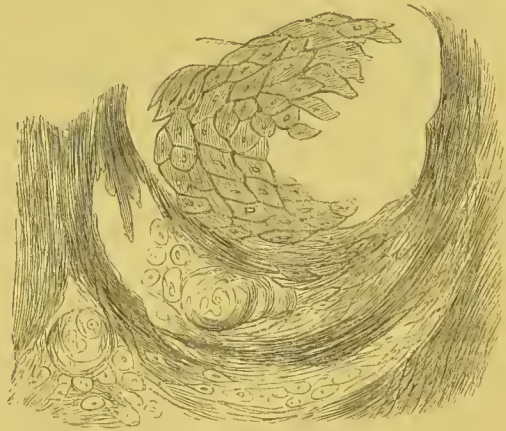


FIG. 29.—Epithelioma : laminated capsules.
× 200.

scirrhus ; and a few years ago would certainly have been so called. The microscopie examination, however, showed that it was a true epithelioma.

Very rarely other forms of cancer are met with in the tongue. Thus, the late Mr. Moore published a case in which the disease—a hard, ulcerated tumour of sixteen years standing—belonged to that variety of epithelial cancer to which the term rodent ulcer is applied. (“ Rodent Cancer,” p. 122). Mr. Erichsen has figured the microscopical appearances of a case of encephaloid cancer of the tongue (“ Surgery,” 6th ed. i. p. 598), and Mr. Heath has recorded a case which belonged to the same class. (“ Path. Soc. Trans.,” vol. xx.) But, notwithstanding these exceptions, there can be no doubt that the vast majority of cancers of the tongue have those characteristics which pathologists recognise as the distinguishing marks of epithelioma.

As epithelioma is by far the most frequent form of cancer met with in the tongue, it may be well to point out the clinical characters which distinguish it from the other varieties of malignant disease.

Epithelial cancer is almost always met with in close connection with either a mucous or a cutaneous surface. The exceptions to this rule are very few. It is prone to take its origin from local irritation. Speaking generally, it advances more slowly than the other forms of malignant disease, and remains for a longer time a purely local affection, so that the surgeon has a better chance of removing the whole growth by an operation. It diffuses itself slowly into the neighbouring lymphatic glands, so that it is less apt to give rise to secondary growths in the deep-seated viscera. For this reason it produces less of that systemic infection which is known as the cancerous cachexia.

Several of these general features of epithelioma are well illustrated by the forms of that disease that are met with in the tongue. But from the situation and importance of this organ, it here runs a more acute course than when it occurs in an outlying part, such as the lip, or the scrotum. Some writers have argued, that because epithelioma differs somewhat in its clinical history from scirrhus, or medullary disease, it is therefore not to be regarded as a cancer. But no one can study it, as it manifests itself in the tongue, without being speedily convinced that it has all the leading characters of this formidable class of diseases, and that it is in fact a most malignant affection.

As I have said, the early stages of cancer of the tongue are sometimes difficult to distinguish from the simple

affections of that organ, and they are still more frequently confounded with its syphilitic diseases. Indeed the diagnosis between cancer and syphilis is a matter of so much moment, and often requires such nice discrimination, that each of the points mentioned in the table at page 157 should be carefully noted, in order that no doubt may remain as to the real nature of the case under consideration.

Where there is any uncertainty, if the patient has not already been treated with antisyphilitic remedies, he ought at once to be brought under their influence. As cancerous disease is almost entirely beyond our control, while our power over the manifestations of syphilis is very great, it is only right, where there exists a shadow of a doubt, to see whether mercury or iodide of potassium have any effect upon the complaint. It is astonishing how some cases improve, and ultimately recover, under antisyphilitic treatment, which have presented so many of the features of malignant disease as to fill us with apprehension. I have known instances in which it seemed as if the invalid's days were numbered, and which appeared all but hopeless, where a cure was effected by a judicious prescription. The best way of proceeding in such a case is to bring the patient speedily under the influence of those drugs which are almost specifics in syphilitic disease. With this object, sedatives or narcotics should be given to quiet his nervous system, and at the same time the iodide of potassium should be ordered. If the state of his general health warrants it, calomel, or gray powder, or Plummer's pill ought to be prescribed in addition. Another useful course of treatment is to order the mercurial to be used as an inunction, or as a

vapour bath. The directions with regard to regimen, which are given at page 129, must at the same time be strictly enjoined, and if the sufferer can have complete cessation from business, and change of air and scene, so much the better. The surgeon should note accurately the extent of the disease, the amount of induration, the degree in which the glands are affected, and all the other points which may serve to gauge the effect of the remedies. He should then lay down the plan of treatment to be pursued, and arrange to see the patient again in a week or ten days. By that time it will be apparent whether the symptoms are yielding or not. If they are, the same measures must be steadily persevered in, until the amendment is so great that milder drugs of the same class may be substituted for those that have hitherto been given ; or until the cure is so far advanced that the specific treatment may be discontinued altogether. But if no improvement has taken place, some variation may be made in the mode of administering the specifics,—for example, if mereury and iodide of potassium have been prescribed separately, they may be tried in combination, or if mereury has been given internally, it may be ordered as a fumigation—and the patient may be encouraged to give them a longer trial. If, after the lapse of a month or six weeks, the symptoms are no better, but, on the contrary, worse, all doubt will be at an end, and the malignant character of the disease must be considered as fully established.

The *age* at which malignant disease of the tongue is most commonly met with, and the *sex* in which it is most frequent, are points of great importance as bearing upon

diagnosis. Thus I have found that thirty-nine cases, of which I have been able to trace the history, arrange themselves, according to the age at which the disease commenced, into the following decennial periods:—

20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.
1	6	12	11	7	2

This corresponds very closely with the grouping of thirty cases of cancer of the tongue tabulated for Sir James Paget by Mr. Morrant Baker in his paper in the “*Medico-Chirurgical Transactions*” (vol. xlv.), and confirms the remark that epithelioma is the cancer of middle and old age. With regard to the extremes of age at which cancer of the tongue may appear, Mr. Liston, after saying that the disease generally occurs in those who have passed the meridian of life, mentions that he once removed a “*carcinoma*” from the tongue of a girl twelve years of age; and on the other hand, in one of Sir James Paget’s cases, the patient was ninety when the growth commenced.

With reference to the influence of sex it appears that cancer of the tongue is much more common in men than in women. Thus of Sir James Paget’s 30 cases, 19 were men, and 11 women. And of the 39 cases that I have collected, 28 were men, and 11 women. The same fact holds good of epithelioma generally. Epithelial cancer of the lip is almost entirely confined to men.

In order to form an idea of the relative frequency of cancer of the tongue among the external or surgical

cancers, I studied the registers of the cancer wards of the Middlesex Hospital, which were most courteously placed at my service by the Medical Committee; and I find that of all the heads under which the various cancers are grouped the tongue stands fourth on the list. The first place is occupied by cancers of the uterus, the second by those of the breast, the third by those of the face, including rodent ulcers. In Sir James Paget's list the tongue holds the second place—the first being occupied by cancer of the breast, cancer of the uterus being excluded altogether. These facts go far to indicate the relative frequency of malignant disease of the tongue, as compared with other organs of the body, and to show that among surgical cancers of separate organs it stands next in frequency to those of the mamma.

But a more important point is the duration of the disease, and the influence which is exerted over it by operations. Thus of the 39 cases of cancer of the tongue, before alluded to, the average duration was 57 weeks. The shortest ran its course in 14 weeks; the longest extended over 6 years. If we divide these 39 cases into two classes—1st, Those which were not operated on, 25 in number; and 2nd, those which were, 14 in number; we find that the average duration of life, after the disease was noticed, was in the 1st class, 42 weeks—the longest period being less than two years; while in the 2nd class, the average was 86 weeks—the longest period being six years. Thus it is evident that the balance is much in favour of the cases that were submitted to operation; and this tallies with the conclusions that have been arrived at by Sir

James Paget. ("Lectures on Surgical Pathology," 2nd edit., p. 726, and "Med. Chir. Trans.," vol. xlv.)

From these figures it appears that cancer of the tongue is even more rapidly fatal than other kinds of malignant disease. Thus in scirrhus of the breast the average duration of life is rather more than four years; in medullary disease the average duration of life is rather more than two years; in epithelial cancers generally it is about three and a half years (Paget's "Lectures," xxx., xxxi., xxxii.). But in cancer of the tongue, considered alone, the average duration of life is, as I have said, only fifty-seven weeks.

Though cancer is thus frequently met with in the tongue it is almost always primary. Secondary cancer in this situation is extremely rare. The only case of the kind that I am acquainted with is recorded by Mr. Sibley, in his well known paper on the statistics of cancer. ("Med. Chir. Trans.," vol. xlii.) The patient, a man aged sixty-three, applied at the Middlesex Hospital on account of a tubercle which had been growing for a year on the inner side of his left leg. When he first noticed it, it was not larger than a pin's-head, but he scratched it, and it never healed. When admitted into the hospital, in November, 1853, it was of the shape and size of an egg. Soon after admission he began to complain of sore throat, and an ulcer was discovered at the base of the tongue. It rapidly extended to the tonsil, and the glands beneath the jaw became enlarged. After this the sore on the leg remained stationary. The throat gradually grew worse, the ulceration extending, and producing great difficulty in swal-

lowing food. An opening made its appearance over the glands beneath the jaw, and he gradually sank, and died in May, 1854. Not unfrequently the tongue becomes affected by the extension of a disease which has had its origin in some neighbouring part, as the gum, the cheek, or the sub-maxillary gland. That is to say, it is attacked at a late date in the progress of a primary cancer. But as a true secondary disease, propagated by dissemination from some distant part, cancer of the tongue is a thing of extreme rarity.

With regard to the treatment of cancer of the tongue nothing can be done by medicines to effect a cure. Notwithstanding the "specifics" which have been recommended from time to time, no drug has yet been found which has any power to arrest the progress of malignant disease in this or in any other locality. It is hardly necessary to say that everything should be done to rectify the patient's general health, and that all sources of local irritation should be removed. By these means something may be effected to improve his position, and to check for a while the activity of the disease. But our main reliance must be placed in operative treatment.

As soon as the nature of the case has been settled beyond a doubt, the question of an operation should be considered. If the surgeon thinks proper to recommend one, the patient should be urged to submit with as little delay as possible; for here, as elsewhere, it is an early and complete removal of the disease which holds out the best hope.

There are two conditions in which the surgeon is war-

ranted in undertaking an operation for cancer of the tongue: (1) When the disease is in its early stage, when it can be entirely taken away, and when a cure is not altogether beyond expectation; and (2) When the pain is so great, and the symptoms are so distressing, as to render an operation advisable with the view of giving mere temporary relief. We shall now consider the proceedings suitable to these two conditions, and we shall speak of them as the complete and the partial operations respectively.

It is only when the case is early submitted to an operation that we can hope to remove the disease completely. Even if the glands are slightly affected, this need not necessarily deter the surgeon. They may perhaps be removed at the time of the operation; or, if they are left, they may recover their natural size when the cause of irritation has been taken away.

There are various methods by which a cancer of the tongue may be removed. It may be cut out with the knife; or it may be separated with the galvano-cautery or the *écraseur*; or it may be tied, and allowed to slough off. Besides these there are other means which have been practised, such as the insertion of caustic arrows, but which are no longer in use, at least in this country, and which therefore it is not necessary for me to describe. Of the means I have enumerated, the knife is the surest, and the most expeditious. It is the surest, because the blade can be made to follow the shape of the growth, so as to cut clear of it all round; and it is the most expeditious, because it frequently happens that a single incision suffices

to remove the whole disease. But an operation with the knife has this drawback, that there is apt to be very sharp bleeding. Vessels may have to be tied; and, in order to do this satisfactorily, the surgeon may need the help of the patient in controlling the movements of the part. It is also desirable that the sufferer should be able to get rid of the blood which may flow backwards, trickle down into the larynx, and give rise to very troublesome spasmodic cough. For these reasons it is not advisable to administer chloroform, and the patient has to endure an operation, upon a particularly sensitive and uncontrollable organ, without the comfort of an anæsthetic.

If, however, any of the other methods that I have named are employed there is either no hæmorrhage at all, or so little that the surgeon need not fear to put the patient into a state of unconscionousness before he proceeds to remove the cancer.

The galvano-cautery is a means of operating which has only been introduced of late years, but which bids fair to be a great addition to our resources. Its advantages are these,—that it cauterizes the tissues at the same time that it divides them, and thus its use is followed by little or no hæmorrhage. But in order to secure this result, the operation must not be performed too rapidly. Another advantage is that the wire can, if need be, be introduced, while cold, into deep structures, then rendered incandescent, and moved in any desired direction. The most convenient instrument of this description is that devised by Middeldorpf of Breslau. It consists of a wooden handle, divided longitudinally. Along this pass a couple of copper

wires, one of which is cut in two. When these two halves are in contact, the electric circle is complete. When they are separated, the current is interrupted. These wires are connected at one end with a battery, while at the other a platinum wire is attached, which can be made of any form required for an operation.

The *éraseur* is another of the additions which have been made of late years to the armamentarium of the surgeon, and which is extremely valuable in many cases. It is now so well known that it is scarcely necessary for me to describe it. Suffice it to say that it consists of a chain, or wire, disposed in the form of a running loop at the end of a shaft. This shaft is provided with a suitable handle, and with a powerful screw, by means of which the loop can be drawn tight. When it is to be used, the growth is first thoroughly isolated, the chain or wire is then adjusted round the point where the desired section has to be made. Two or three long needles are introduced, to prevent the noose from slipping, and then the screw is slowly turned. By this means the wire cuts, or rather tears, its way through the tissues, leaving a clean, dry, raw surface behind it. The great advantage of this instrument is that little or no bleeding follows its use. Indeed, if an *éraseur* is selected which is fitted with rather a coarse cord composed of several strands of wire, and if it is worked very slowly—say one half turn of the screw every minute—it will generally be found that there is no hæmorrhage whatever. This being the case, there is no reason why the patient should not have the benefit of an anæsthetic. But it is only where the whole growth can be isolated, so that it

can be entirely removed by straight sections, that the éraseur is suitable. An ingenious use has been made of two éraseurs at once in removing the whole tongue. A recent example of this mode of treatment has been reported by Mr. Furneaux Jordan. ("Lancet," April 20, 1872). A needle carrying two threads was passed deeply through the root of the organ. By means of these threads the chains of two éraseurs were introduced, and one was made to cut its way upwards, while the other was brought out horizontally. In this manner the whole tongue was excised without any hæmorrhage, and while the patient was under the influence of chloroform.

The ligature has long been in use for removing tumours both simple and malignant; and in some few instances it is the most suitable method of dealing with cancer of the tongue. The organ should be drawn well forward by means of a hooked forceps, and then a stout silk thread, or a fine whipcord tied round the base of the morbid growth in such a way as to destroy its nutrition, and lead to its sloughing. The manner in which the ligature is applied must vary according to the precise nature of the case. Speaking generally, the tongue must be transfixed at a point beyond the utmost limits of the disease, and the tumour tied in two or more portions. In doing this curved needles in handles, more particularly the spiral or cork-screw needle, will be found of great service. Mr. J. M. Arnott, following Cloquet, ligatured the tongue in portions, by means of threads passed through an incision in the sublingual space. ("Med. Chir. Trans." vol. xxii.)

The main advantage of the ligature is that it is followed

by no hæmorrhage. But it has its drawbacks. The patient suffers considerable pain for several days, in consequence of the sensitiveness of the tissues which are compressed by the noose; and there is an inconvenient amount of swelling and salivation. A still more serious objection is that the presence in the mouth of a slough, which may not separate for ten or twelve days, is extremely disagreeable to the patient, in consequence of the fœtor to which it gives rise. As a general rule, in dealing with cancer of the tongue, it is desirable to remove the disease at once, and to give the parts immediate and perfect rest. For this reason I do not look upon the ligature with favour, and would only recommend its use in some exceptional cases.

When the most suitable operation has been decided upon, and the surgeon is about to perform it, care should be taken to place the patient in the best possible position, and in a good light. If he is not to have chloroform, he may prefer to be seated in an arm-chair; in which case an assistant ought to stand behind him to steady his head. But it will generally be possible for him to have the comfort of an æsthetic; and then it is best that he should be placed on a high couch, well supported with pillows, so as to be in a semi-recumbent position. When unconsciousness has been produced, the mouth should be fully opened, and secured by a gag. Several ingenious, but rather complicated, instruments have been devised for this purpose; but a wooden gag, or even an ordinary cork, or a small roll of bandage, placed far back between the molar teeth on both sides, or on that opposite the seat of operation, will be found to answer the purpose sufficiently well. The

surgeon is thus able to get a clear view of the whole organ ; and if he seizes it with a hooked forceps, or with any convenient instrument of a similar kind, he has it entirely under control, and can make such preliminary incisions as may be necessary before he removes the diseased portion. In addition to the knife, the galvano-cautery, or the *éraseur*, which he may be about to use, the surgeon ought to have at hand a suitable forceps for taking up bleeding vessels, a *tenaculum*, (which may be needed for the same purpose,) some curved needles threaded with silk, an actual cautery, a little of the tincture of steel, and some ice, together with the ordinary hempen ligatures. If the ligature is the means selected to remove the disease, he should be provided with long and strong curved needles in handles, and with the ordinary saddler's whipcord, which is less likely to cut the soft tissues than the finer kinds of the same material.

In all these operations it is of great importance thoroughly to isolate the tumour, so that the means which are used for its removal may be applied in such a manner as to take away the whole extent of the morbid tissue. To facilitate this object Mr. Southam of Manchester has devised a very convenient forceps. It is broad enough to lay hold of the entire width of the tongue, and to draw it well forward, so that the operator may see, and reach, the whole of the disease with which he is dealing. Or Lühr's forceps may be used in the same manner. If such an instrument is employed to draw the tongue forward, I believe there are few cases, suitable for an operation at all, in which the disease may not be reached from the mouth, more particularly if the anterior

and lateral attachments of the tongue are freed by incisions. When, however, the surgeon cannot get at the tumour satisfactorily by these means, there are other expedients which have been adopted in order to bring the tongue fully into view. Thus, Regnoli of Pisa has recommended that an incision should be made through the floor of the mouth, along the inner surface of the lower jaw, from a point a little in front of one facial artery to a corresponding point on the opposite side, a second incision being made vertically from the chin downwards towards the hyoid bone, and that the tongue should be drawn out at the opening thus made. This is an operation which may easily be performed, and the incision may be varied somewhat according to the circumstances of the case.

The late Mr. Nunneley of Leeds introduced a modification of this operation by which he treated a large number of cases with success. Instead of the extensive incisions recommended by Regnoli, he made a mere puncture in the hypo-glossial space, passed the chain of an écraseur through it, drew the tip of the tongue through the loop, determined the line of section by vertical needles, put the serew in action, and thus removed a great part of the organ.

Though these operations are extremely ingenious, and may sometimes be found very useful, as a general rule it is wisest to avoid making an opening in the sublingual region. Any incision within the mouth—either on the tongue itself, or on the parts adjacent to it—heals with remarkable rapidity. But when an opening is made in the most dependent part of the cavity, there

is apt to be a drain of fluid through it, which keeps the wound open for some time.

Mr. Syme, following Sédillot, practised another method of exposing the whole tongue. He divided the lower lip by a vertical incision in the middle line, carrying it down a little below the chin, sawed through the symphysis menti, and thus brought the organ fully into view quite down to the hyoid bone. He then removed the whole tongue with the knife. Here there is not merely a long incision through the soft tissues, but there is also the additional risk of a section through bone. As we might expect, such a severe operation carries with it a high rate of mortality; and, when recovery takes place, convalescence is often tedious, as the bone is slow to unite. But the number of cases in which such a formidable proceeding can be justifiable is small; and it would be smaller still if the public at large were alive to the importance of having early recourse to operative measures in malignant diseases.

Other surgeons have followed the example thus set by Sédillot and Syme, in dividing the symphysis menti, and have varied the operation by removing the tongue with the éraseur, or tying it in portions by means of ligatures.

Dr. George Buchanan recommends the removal of one lateral half of the tongue, and lays much stress upon the importance of carrying the incision through the median line. This practice may be adopted whatever method of reaching the tongue the surgeon employs. One patient operated on in this way is reported to be alive and

well five years afterwards, which is a very encouraging result.

In all cutting operations upon the tongue the surgeon must be prepared for considerable bleeding from the larger arteries which supply the organ, and also from the general surface of the wound. This hæmorrhage must be arrested either by the application of ligatures in the ordinary way, by torsion, or by the actual cautery ; and if there is much oozing, the cut surface should be touched with the muriated tincture of iron, and ice should be put into the patient's mouth. As it is sometimes difficult to bring the bleeding points into view after the tumour has been removed, and as the patient may be little able to assist the surgeon, it is desirable in some instances, at the commencement of the operation, to pass a ligature through the sound portion of the organ, which may be used to draw it forward. Though the tongue bleeds freely even after a very slight wound, the danger arising from this cause has been greatly over-estimated, and the surgeon need not hesitate to do what seems otherwise desirable from fear of the hæmorrhage.

Though these operations upon the tongue are usually perfectly satisfactory in their immediate results, it is seldom that they avert altogether the fatal issue. Cancer of the tongue is a very deadly affection, and, however completely the growth may be removed, it is only too probable that the disease will ultimately return, either in that part of the organ which is left, or in the neighbouring glands. Still there is no reason why the surgeon should feel discouraged, as some have done, or refuse to give

the patient such assistance as lies in his power. In a few cases there is no return of the disease for years; and in many more signal, though it may be only temporary, relief is given both to the body and mind of the sufferer.

When a patient has undergone any of these operations upon the tongue, he ought to be kept in bed for a longer or shorter period, according to the gravity of the symptoms; because they are apt to be followed by a good deal of fever and constitutional disturbance. It is also easier to apply poultices or fomentations to the neck, and to use any other local applications which may be necessary, when the patient is in the recumbent position. If any of those operations are selected which are accompanied by an external incision, such local applications will most probably be required; for the wound will have to be treated like a skin wound in any other situation, and it may indeed be attended by very profuse suppuration. It will not be necessary to desire the patient to refrain from speaking, for the attempt to do so will be too painful to be persisted in; but, in order that he may be able to communicate with those around him, he ought to be furnished with a slate, or paper, and a pencil. His food must, of course, be entirely liquid, and of the blandest description. As a wash for the mouth, a solution of chlorate of potash, or a little of Condyl's fluid, diluted with water, may be recommended; but simple warm water, or poppy fomentation, will often be found the most suitable, for in every operation of this kind there will be inflammatory swelling, and, if not a slough, at least some amount of offensive discharge.

If a complete operation is out of the question, if there is no hope of removing the whole of the diseased tissues, a partial operation may yet be undertaken to relieve the more distressing symptoms, and to render the patient's condition more tolerable. The amount of pain experienced by persons suffering from cancer of the tongue varies much in different cases. No doubt the original constitution of the patient, as well as the exact degree and manner in which the nerves are implicated, influences this point. As a general rule there is from the first occasional, darting pain, and as the disease advances this becomes both more severe in its character, and more wide-spreading in its extent. Then, when ulceration takes place, a surface is exposed which is exquisitely sensitive to the contact of food, as well as to the movements of the mouth; and later still, when the disease begins to invade the lymph-glands and the adjacent tissues, the patient's distress is much increased. But these stages may be reached very slowly. I have known a case last for two years with very trifling pain, and then become rapidly worse, the glands becoming indurated, and all the symptoms being increased in severity. In this case the sudden aggravation coincided with pregnancy, and the patient died three weeks after her confinement.

If the pain is very distressing, and if it is localized, an operation may properly be undertaken with the sole object of relieving this symptom. Here it is probable that some nerve is involved in the disease in such a way as to cause acute suffering, and great relief will be experienced by removing the sensitive portion. For this purpose one of the immediate operations with the knife, the galvano-cautery or

the éraseur should be selected. The ligature is only likely to increase the patient's distress.

Mr. Hilton recommends division of the lingual nerve, either for cases in which great pain is a leading feature, or as the first step in the operation by ligatures. The tongue being drawn well forward and to the opposite side, the mucous membrane and submucous tissues should be divided vertically, for about three quarters of an inch in length opposite the molar teeth, over the hyo-glossus muscle, and across the position of the upper margin of the sublingual gland. In a case related in Mr. Hilton's paper, the pain, which had been very severe, was completely abolished for a month. At the end of that time it began gradually to return. Where the object of the surgeon is merely to remove pain, Mr. Hilton advises that a small portion of the nerve itself should be cut out. ("Guy's Hosp. Rep.," 2nd series, vol. vii.)

The method adopted by the late Mr. Charles Moore effects the same object in a still better way. He divided the nerve, where it lies behind the last molar tooth, and immediately beneath the mucosa.

"The guide to the nerve," says Mr. Moore, "in this situation is the last molar tooth. On passing the finger into the mouth within and beyond the tooth, the bulging alveolar ridge can be felt, narrowing as it ascends into the thin coronoid process. Behind, below, and parallel with the ridge, is the nerve. A line drawn inside the lower jaw, from the crown of the last molar tooth to the angle of the jaw would cross it at right angles about half an inch from the tooth. An incision, therefore, in the direction of such

a line, three-fourths of an inch in length, and carried through the mucous membrane to the inner surface of the bone, must divide the nerve. It is advisable to operate with a curved bistoury, since the alveolar ridge would shield the nerve from the edge of a straight knife. It is also advisable to be exact in observing the position of the alveolar ridge, or, in its absence, the edge of the toothless gum curving up to the ramus." ("Med. Chir. Trans.," vol. xlv.)

The papers in which Mr. Hilton and Mr. Moore have given their experience of these operations will well repay a perusal; for there can be no doubt that in cases where profuse salivation, and pain within the area of the fifth nerve, are among the prominent symptoms, section of the nerve may be practised with great benefit to the patient.

The temporary relief afforded by these palliative operations is generally great, and patients would often gladly undergo a similar proceeding from time to time in order to mitigate their sufferings. Dr. John Reid, the distinguished Chandos Professor of Anatomy, who was himself a victim of cancer of the tongue, in one of his letters to Sir William Fergusson, says:—"I would very willingly undergo any day the operation you performed upon me, for a small part only of that relief from suffering which it afforded me." And a little later, writing to Dr. Hughes Bennett, he says: "Instead of regretting the operation, I have every reason to be grateful for the relief and comfort which it afforded me for several months, and willingly, most willingly, would I undergo it again for the same advantages." (Life by Dr. Geo. Wilson, ch. vii.) Indeed, there is no class of cancers in which the surgeon is more fully justified in

recommending an operation, even in extreme cases, than those which affect the tongue. The immediate risk is trifling, the pain caused by the use of instruments can be diminished by chloroform, the recovery is generally very rapid, and the period of comparative comfort which is thereby secured often lasts for many months.

M. Demarquay has recommended ligature of both lingual arteries with the view of causing the atrophy of the cancer. But this is an operation which is not regarded with much favour in this country. It seems very doubtful whether it has any power to retard the progress of the growth, and, such being the case, it is hardly worth while to subject the patient to the risks which attend it.

Supposing, however, that the case admits of no operation, and that the only thing the surgeon can hope to do is to alleviate the more urgent symptoms, there are many drugs which he will find of great use. Thus, pain may be blunted by conium, and sleep may be induced by opium, chloral, chlorodyne, or hyoseyamus; while in some instances the subcutaneous injection of morphia is of the utmost value.

If there are enlarged glands, which cause much pain, they may be smeared with opium ointment, or the extract of belladonna, or aconite liniment, or an opium or belladonna plaster may be laid upon them.

In some of these cases the backward pressure, arising either from extension of the disease, or from œdema, is so great that the patient is unable to swallow food; and then, to keep him alive, it may be necessary to feed him by means of the stomach-pump, or by enemata.

If sloughs occur, as they are very apt to do, the

patient should be ordered a simple wash, composed of chlorate of potash, or dilute Condyl's fluid, and arsenic or iron may be given internally. If the sloughing is accompanied with bleeding, a wash containing some astringent, such as alum, catechu, or tannin may be prescribed instead. If this is not enough to control the hæmorrhage, the bleeding point should be brought into view and touched with lunar caustic, or a pledget of lint dipped in the tincture of steel, or of matico, should be firmly pressed for a few minutes upon the spot from which the blood is flowing, or small fragments of ice may be placed in the patient's mouth.

By the judicious use of these and similar measures which the particular circumstances of each case will suggest, much may be done to palliate the patient's sufferings, to smooth the pathway of death, and to promote that euthanasia which Lord Bacon says ought to be one of the great objects of our art.

It is only of late years that surgeons have undertaken to remove any considerable portion of the tongue, and some have been surprised to find not only how free from danger the operation was, but also how speedily and distinctly their patients could speak after having lost a great part of that organ. I shall, therefore, conclude this chapter by bringing together such cases as I have been able to find upon record, in which the tongue was cut out, or had sloughed away, or had been otherwise lost; and in which, notwithstanding, the patient had made a good recovery, and had retained the power of speech. "Man's inhumanity to man"

frequently accomplished that which surgeons long hesitated to undertake, and the record of these barbarous punishments might well have prepared us for the satisfactory results which are now attained by scientific surgery.

In A.D. 484 about sixty Christian confessors of Tipasa, a maritime colony on the north coast of Africa, had their tongues cut out by order of Hunnerie, the Vandal conqueror; but within a short time some at least of them were able to speak with such distinctness that it was accounted a miracle, and it was supposed to be a signal mark of the divine favour that men who had been deprived of their tongues could still go about preaching. (Gibbon's "Hist.," ch. xxxvii.; Milman's "Latin Christianity," Bk. iii. ch. 4.) Even during the present generation this view of the matter has been maintained. (J. H. Newman's "Essay on Miracles.") But the accumulated experience of surgeons may now be considered to have given its verdict on the case. We may fully accept the facts, for they come within the domain of natural science, and they correspond exactly with the results which are now being obtained by surgical operations; but there is no need to suppose that there was anything miraculous in the occurrence. Any of my readers who are interested in the subject will find it fully discussed in a work by the Hon. Edward Twisleton, entitled "Illustrations of the Power of Speech in Persons said to have been deprived of their Tongues."

We find that in the middle ages it was no unusual thing to condemn persons who had made an unwelcome use of speech to have their tongues cut out. The Bishop of Caithness was treated thus in A.D. 1201 for venturing to

intercede with Harold for the life of some prisoners. ("Orkneyinga Saga," and the "Letters of Pope Innocent III.") Again, the ordinances of Louis IX. of France condemned perjurers and blasphemers to have their tongues burnt with a red-hot iron ("Mém. de l'Acad. Roy. de Chir." iii. 364); while Langius of Lemberg records that in Germany, Italy, and Spain similar culprits were punished by having the tip of the tongue cut off—the first step in the execution of the sentence being to nail the offending member to the trunk of a tree. ("Epist. Med.," Lib. i. Ep. 4). The case of Pope Leo III., which is narrated by Milman ("Latin Christianity," Bk. iv. ch. 12), is another instance of a somewhat similar mutilation, the recovery from which came in process of time to be reckoned a miracle. I am also indebted to Mr. Twisleton for having drawn my attention to the account of some French Protestants who in the middle of the sixteenth century were condemned to have their tongues cut out before they were led to the stake. One of them, immediately after the operation, repeated three times, "*Le nom de Dieu soit béni.*" In another case the martyrs spoke so distinctly after mutilation that the executioner was accused of not having carried out the sentence.

Sir John Maleolm, who was sent on a special mission to Persia by the East India Company, alludes to the same practice. In his account of his residence at Teheran, speaking of Zâl Khan, of Kisht, he says—"This remarkable man had established a great name in his native mountains, between Abushir and Shiraz, and he was long distinguished as one of the bravest and most attached followers of the

Zend family. When the death of Lootf Ali Khan terminated its power, he, along with the other governors of provinces and districts in Fars, submitted to Aga Mahomed Khan. That cautious and cruel monarch, dreading the ability and doubtful of the allegiance of this chief, ordered his eyes to be put out, an appeal for the recall of this sentence being treated with disdain. Zâl Khan loaded the tyrant with curses. 'Cut out his tongue,' was the second order. This mandate was imperfectly executed; and the loss of half the member deprived him of speech. Being afterwards persuaded that its being cut close to the root would enable him to speak so as to be understood, he submitted to the operation, and the effect has been that his voice, though indistinct and thick, is yet intelligible to persons accustomed to converse with him. This I experienced from daily intercourse. He often spoke to me of his sufferings, and of the humanity of the present king, who had restored him to his situation as head of his tribe and governor of Kisht.

"I am not an anatomist, and cannot, therefore, give a reason why a man who could not articulate with half a tongue, should speak when he had none at all; but the facts are as stated, and I had them from the very best authority, old Zâl Khan himself." (1828.)

Colonel Churchill, in his work on the Lebanon, mentions that certain emirs, who had plotted against their superior, the Emir Bechir, were punished by having their tongues cut out. He says:—"Each emir was held down in a squatting position, with his hands tied behind him, and his face turned upwards. The officiating tafeketchy now

approached his victim, and standing over him, as if about to extract a tooth, forced open his mouth, and darting a hook through the tip of his tongue, pulled it out, until the root was exposed; one or two passes of a razor sufficed to cut it out. It is a curious fact, however, that the tongue grew again sufficient for the purposes of speech." (Churchill's "*Mount Lebanon*," 1853, vol. iii. p. 384.)

A correspondent of "*Notes and Queries*," who was interested in this subject, on meeting with the foregoing passages, wrote to Sir John McNeill, the late British Ambassador in Persia, to inquire if his experience enabled him to confirm Sir John Malcolm's statements. The following is his reply, bearing date January 8th, 1857:—

"In answer to your inquiries about the powers of speech retained by persons who have had their tongues cut out, I can state from personal observation that several persons, whom I knew in Persia, and who had been subjected to that punishment, spoke so intelligibly as to be able to transact important business. More than one of them, finding that my curiosity and interest were excited, showed me the stump, and one of them stated that he owed the power of speech to the friendship of the executioner, who, instead of merely cutting off the tip, as he was ordered, had cut off all that was loose in the mouth—that is, all that could be amputated by a single cut from below. The conviction in Persia is universal that the power of speech is destroyed by merely cutting off the tip of the tongue, and is to a useful extent, restored by cutting off another portion as far back as a perpendicular section can

be made of the portion that is free from attachment at the lower surface.

“Persons so circumstanced appeared to me to use the arched portion of the tongue, which is behind the point of section, as a substitute for the whole tongue, or rather for the tip. This precluded the articulation of certain consonants, but guttural substitutes came to be used, which after a little intercourse, when one had found out the key—as in the cases of persons with defective palates—became quite intelligible.

“I never happened to meet with a person who had suffered this punishment who could not speak so as to be quite intelligible to his familiar associates. I have met with several of them.

“The mode in which the operation is performed as a punishment, will pretty nearly determine how much of the tongue is removed in those cases in which it is said to be cut out by the root. It was described to me as follows, both by persons who had suffered, and by others who had witnessed it. A hook was fixed in the tongue near the point, by means of which it was drawn out as far as possible, and then cut off on a line with the front teeth—one man said, within the mouth, just behind the front teeth.” (“Notes and Queries,” 2nd series, No. 125, May 22nd, 1858.)

The same correspondent of “Notes and Queries,” submitted these statements to Sir Benjamin Brodie, and the following was the opinion which he gave upon them, under date, January 16th, 1857 :—

"There seems to me to be nothing very mysterious in the histories of the excision of the tongue.

"The modification of the voice forming articulate speech is effected especially by the motions of the soft palate, the tongue, and the lips; and partly by the teeth and cheeks. The mutilation of any one of these organs will affect the speech as far as that organ is concerned, but no farther; the effect being, therefore, to render the speech more or less imperfect, but not to destroy it altogether.

"There is no analogy in the higher orders of animals justifying the opinion that the tongue grows again after it has been removed. The facts which have been mentioned bearing upon this question are thus easily explained.

"The excision of the whole tongue, the base of which is nearly as low down as the windpipe, is an impossible operation. The Eastern executioner, however freely he may excise the tongue, always leaves a much larger portion of it than he takes away. In the healing of the wound, the tongue necessarily contracts from side to side, it being a rule that the cicatrix of any wound is always smaller than the wound itself. If the tongue be thus contracted in its transverse diameter, it must be elongated in the longitudinal diameter, and hence it would appear, when healing is completed, to project further forwards than it did immediately after the wound was inflicted." ("Notes and Queries," as above.)

It would hardly have been worth while for us to combat the idea that the tongue once lost can grow again had

it not been that a hundred years ago this belief was so prevalent, even among surgeons, that some eminent men thought it expedient to enter into a discussion on the subject, in reference to the case of the son of a secretary of the Duke of Brunswick, aged seven, whose tongue was said to have grown again after it had been lost from small-pox. In this case it was evident that the tongue had not perished so completely as it was at first thought. ("Mém. de l'Acad. de Chir.," vol. iv.)

This leads me to speak of another class of cases, which bear upon our present subject, namely those in which the tongue has not been cut out as a punishment, but has sloughed away as the result of the severest forms of inflammation. The earliest case of this kind on record is that related by Roland, Surgeon to the French Court in 1630. He describes a boy, between eight and nine years of age, whom he had seen at Saumur. This boy had lost his tongue three years previously from gangrene consequent upon small-pox. It is said that from this cause it had gradually mortified, and that the child had spit it out bit by bit. When seen by Roland all that remained was a double prominence, flattened and attached to the floor of the mouth, extending from the inside of the chin to the oval aperture of the throat. This was composed of muscular tissue, divided by a line, and was like two little muscles with a furrow between them. When this elevation was pressed, or when the child spoke or swallowed, it swelled, gathered itself up, and retracted from side to side towards its middle, or from one side of the mouth to the other, like two leeches joined together. This led

Roland to think that some remains of the genio-hyo-glossal and hyo-glossal museles, which usually cause the motions of the organ, were contained in this small body. The other parts of the boy's mouth had not suffered from the gangrene, but there were several peculiarities in its formation. The teeth were in a double row. The milk teeth had not been shed, and the permanent set had come up behind them, and pointed inwards. This Roland believed was due to their not having been pushed forwards by the tongue. The palate was flatter than usual, and this also the French surgeon attributed to the absence of upward pressure from that organ. The entrance to the pharynx was unusually small, and of an oval shape. The uvula was long and thin, and descended almost to the epiglottis, and the tonsils were as large as chestnuts.

Notwithstanding the loss of his tongue, and these additional defects, the child was able to speak intelligibly, and could discern ordinary flavours. (Roland's "*Aglossostomographia*.") Other cases of a very similar kind have been recorded by Bonami and Aurran. (See Louis, "*Mém. de l'Acad. de Chir.*," vol. iv.)

Of this class also is the well known example of Margaret Cutting, whose case was brought before the Royal Society in 1742, and again in 1747.

This young woman, who was a native of Suffolk, was twenty years of age at the time of the first report. The gentlemen who examined her, thus speak:—"She informed us that she was born at Turnstal, a village within four miles of Wickham Market, where she lost her tongue by a cancer, being then about four years old. It first appeared like a

small black speck on the upper superficies of the tongue, and soon eat its way quite to its root. She was under the care of Mr. Seotehmore, a surgeon of Saxmundham, who soon pronounced the case incurable. However, he continued using the best means he could for her relief. One day when he was syringing it, the tongue dropped out, and they received it into a plate, the girl, to their amazement, saying to her mother, 'Don't be frightened, mamma; it will grow again.' It was near a quarter of a year after before it was quite cured.

"We proceeded to examine her mouth with the greatest exactness we could, but found not the least appearance of any remaining part of the tongue, nor was there any uvula. . . . Notwithstanding the want of so necessary an organ as the tongue was generally supposed to be, to form a great part of our speech, and likewise to be assisting in deglutition, to our great admiration she performed the office of deglutition, both in swallowing solids and fluids, as well as we could, and in the same manner. And as to speech, she discoursed as fluently and well as other persons do. . . . She read to us in a book very distinctly and plain, only we observed that sometimes she pronounced words ending in *ath* as *et*, *end* as *emb*, *ad* as *eib*; but it required a nice and strict attention to observe even this difference of sound. She sings very prettily, and pronounced her words in singing as is common. What is still very wonderful, notwithstanding the loss of this useful organ the tongue, which is generally allowed by anatomists and natural philosophers to be the chief, if not the sole, organ of taste, she distinguishes all tastes very nicely, and can tell the least perceivable dif-

ference in either smell or taste." ("Phil. Trans.," vol. xl. p. 586.)

Margaret Cutting was subsequently brought to London (1747) and submitted to a minute examination by the Fellows of the Royal Society, with the result of confirming the accuracy of the foregoing report. Those who are interested in learning the exact state of her mouth, as well as of her powers of taste and speech, will find a full account in the 44th volume of the "Philosophical Transactions."

Several of the accounts to which I have referred above allude to the oriental notion that the loss of a small portion of the tongue is more detrimental to the faculty of speech than the excision of the whole organ. The same opinion was held by Ambrose Paré (1665). This surgeon even invented a small instrument, in shape like half a walnut-shell, which he believed rendered speech possible when part of the tongue had been lost. He records two cases of men who had been enabled to speak by some such contrivance. The experience of modern surgery, however, does not corroborate this view; but on the contrary shows that the less the portion removed the better chance the patient has of retaining the power of clear and distinct utterance. We must not, therefore, attach any great weight to the oriental belief. I am inclined to think that much depends upon the impression produced on the mind of the sufferer. The victims of this mutilation believed that they could not speak, and the nervous impression was so strong that they did not. The rustic alluded to by Paré spoke when tickled by a companion, while he was in the act of drinking; words came in despite of his mental impression. He attri-

buted this to the use of the basin that he was holding to his lips; and, having by its means regained faith in his powers of utterance, he always carried a basin about with him, and applied it to his mouth when he wished to speak. Ambrose Paré adopted the same view, and invented his instrument in consequence; but it appears to have had no real value, and is now never employed. ("Paré, *Workes of that famous chirurgion*," by Tho. Johnson, Lib. xxiii. ch. 5.)

The effect of a nervous shock is distinctly seen in a case recorded by the celebrated Dr. Tulp of a young man sailing to Italy, who was taken by pirates, and carried to Turkey. On account of his refusal to turn Mahommedan, his tongue was cut out. He was dumb for three years, but recovered his speech suddenly one stormy night, when he was terrified by a vivid flash of lightning which was followed by a loud peal of thunder. (Tulp. "*Obs. Med.*" i. 41.)

CHAPTER X.

VARIOUS TUMOURS OF THE TONGUE, OTHER THAN THOSE
OF PARASITIC, CANCEROUS, OR SYPHILITIC ORIGIN.

THE tongue is liable to be affected by tumours of various kinds, besides those of which I have already spoken. Thus the mucous membrane is occasionally the seat of simple warts, and of polypi. Cysts are also met with, not merely beneath the tongue, but in its substance; and fatty, fibrous, and fibro-cellular tumours have from time to time been removed from this situation.

The occurrence of simple warts on the surface of the tongue is rare. Mr. Bryant relates a typical example of an infant, a year old, who was affected with a crop of them, occupying the greater part of one-half of the organ. They were raised and pedunculated. They had existed for some months. A free application of lunar caustic sufficed for their cure. ("Brit. Med. Jour.," May 16th, 1863.) If this treatment is not found successful, each wart should be cut off separately, together with a small piece of the mucosa from which it springs.

Polypi may occur on any part of the dorsum of the tongue, but their usual seat is about the middle third—that is to say, in that part where the filiform papillæ are most numerous, and most highly developed. When they are

met with in this situation, there can be little doubt that they commence by the enlargement of a single papilla, or of a group of papillæ, which increase in size until they assume the proportions to which we give the name of a polypus. It is no uncommon thing, as I have already said, to find the papillæ much enlarged. Such enlargement takes place in various conditions. Sometimes it depends upon a kind of dropsical swelling from retardation of the circulation. At other times it arises from an overgrowth consequent upon persistent irritation. Thus, in cancer of the tongue I have seen the papillæ so much enlarged as almost to constitute small polypi.

The most remarkable case of polypus on the tongue that I am acquainted with is related by Dr. Huie. The patient was a lady between forty and fifty years of age. About a year before she was seen by the physician she had been exposed to cold and fatigue, and had been attacked by catarrhal symptoms and some inflammation of the fauces. But her complaints yielded to simple remedies, and she thought no more about them. Three months later she was observed to articulate less distinctly than before, and she now began to feel a slight difficulty in swallowing. These symptoms increased, until at length she could take nothing but liquids, or bread soaked in soup or tea. She was invariably worse in damp weather, and it was then only that she had any material difficulty in breathing. A degree of retching was often excited, and caused great distress. The food she took was frequently returned through the nose. She spoke like a person whose tonsils were much enlarged. On inspecting the fauces a small round

tumour was seen filling the greater part of the pharynx, and accompanying the movements of the tongue. The lower portion of the growth could not be brought into view. By passing a ligature over the tumour it was ascertained that it had a narrow pedicle. The ligature was accordingly tightened, and the mass strangulated. On the fourth day it came away entire. It was oval in form, and was found to weigh exactly an ounce, and to measure five inches in its long, and four in its short circumference. On section it displayed a firm, cartilaginous nucleus, as large as a chestnut, surrounded by fibro-cartilaginous tissue.

Dr. Huie conjectured, and with great probability, that during the inflammatory affection of the fauces, the increased action had been greatest at one particular point, and had occasioned there a minute deposition of coagulable lymph, immediately under the mucous membrane; that this being thus raised, and the lymph itself becoming organized, the little tumour continued to elongate until it became pendulous; and that it then went on increasing in size at the lower part, owing to the less ready return of the blood towards the pedicle. After the operation the patient recovered perfectly, and had no return of the disease. This case is remarkable as showing the rapidity with which a polypus may form, and the manner in which nature accommodates itself to, and tolerates, the growth. ("Ed. Med. Chir. Trans.," iii. 72, 1829.)

Louis mentions that he removed a tumour of this kind, as large as a nutmeg, from the dorsum of a young man's tongue; and a case of a similar description was brought

under the notice of the Pathological Society by Mr. Mason. ("Trans.," vols. xv. and xviii.)

There is in the Museum of the Middlesex Hospital a fatty tumour an inch and a half long, which was removed from beneath the tongue, where it looked like a ranula. An analogous growth was exhibited at the Pathological Society by Mr. Frederiek Churchill in 1872. Liston also mentions another in his "Practical Surgery" (p. 292). In the Museum of the College of Surgeons is a fatty tumour (No. 1065) from the substance of the tongue, which was presented by Sir Astley Cooper.

Gross mentions a case of enchondroma in the tongue, but this variety of morbid growth must be considered extremely rare in this situation.

Sir James Paget says that he excised a bilobed tumour, half an inch in diameter, having the characters of a fibro-cellular growth, from the tongue of a young man. It was situated in the very substance of the organ, and had existed for three years. ("Lectures," ch. xxiv.)

The same eminent surgeon removed a fibrous tumour which projected on the dorsum of the tongue. ("Lancet," Dec. 14th, 1867.)

In the museum of the Royal College of Surgeons are two specimens of a somewhat similar kind—the one a fibro-cellular (No. 1066), the other a "firm and obscurely fibrous" tumour. (No. 1067.) The first was removed by Sir Everard Home, the second is shown *in situ*. It is as large as a walnut, and situated at the left side of the base of the organ. The mucous membrane of all the parts

behind it is very œdematous, and the papillæ of the tongue are enlarged to a remarkable degree.

In the "*Lancet*," for Oct. 17th, 1863, Mr. Folker, of Hanley, has related a case of a tumour on the left side of the tongue, which had been growing for twenty years. It was removed with the knife, and was found to weigh a quarter of a pound. What its nature was is not stated. Probably it was fibrous, or fibro-cellular. It is chiefly remarkable on account of its slow, steady growth, and the size to which it attained.

Mr. Brady has narrated the case of a boy, aged fourteen, who had had a tumour growing underneath his tongue from birth. As it had attained such a size as to fill the mouth, and endanger the lad's life by suffocation, it was removed with the *éraseur*. Though its microscopical characters were like those of the recurrent class of tumours, the boy was reported well, and actively employed, a year after the operation. ("*Med. Times*," April 13th, 1867.)

If any difficulty should be experienced in distinguishing fibrous, or fibro-cellular, tumours from syphilitic or other indurations, it should be borne in mind that the former are of very slow growth, that they are sharply defined and moveable, and that they are covered with healthy mucous membrane, which slides over them.

Occasionally tumours are found in the tongue which bear a close resemblance in their general features to the syphilomata, but which seem to have rather a strumous or tubercular origin. In the earlier years of life, before the age of twenty, such tumours are not very uncommon.

They are analogous to the scrofulous deposits which we so often see in other parts of the body, and, like them, are of a very chronic character. A girl, of the age of fourteen, has been under my observation for a couple of years, who has a solid, inelastic tumour, as large as a filbert, in the right half of her tongue. The tissues around it are somewhat thickened, and the mucous membrane studded with distended papillæ, looking like small cysts or grains of boiled sago. It first attracted attention when she was nine years old, and has remained much the same ever since. Treatment does not seem to produce any effect upon it. The girl is very strumous-looking, and her father has suffered severely from scrofulous disease of the joints. I have, therefore, no doubt that the tumour in the tongue is of a tubercular character, and I anticipate that at some future time it will soften and break.

A case is related of a boy, four years old, who had a tumour the size of a nutmeg near the tip of his tongue. As it did not yield to gray powder, but rapidly increased to the size of a hen's egg, it was removed by a steel clamp, and the bleeding stopped by the actual cautery. The child recovered perfectly. ("Lancet," April 26th, 1826.) In another case, a girl of eighteen had on her tongue a tumour as large as a big strawberry, and of a purple colour. It was noticed soon after birth, and is reported as an aneurism by anastomosis. It was, however, entirely cured by a mercurial course. ("Lancet," March 30th, 1833.) What was the essential nature of the disease in these cases we can only surmise. But my experience would lead me to say that the tumours must have originated in deposits which

were the result either of inherited syphilis or of struma.

Mr. Sedgwick has put upon record in the 12th volume of the "Pathological Society's Transactions" (p. 234) a singular case of "true keloid" on the right side of the tongue in a girl four and a half years of age. It was associated with hard, elevated patches of the same disease on the back, chest, face, and other parts.

I have already in speaking of the congenital diseases of the tongue mentioned that cysts are occasionally met with beneath it. I shall now speak more at length of the cysts which are found in the hypo-glossial region, and also describe those which occur in the substance of the organ.

The mucous membrane beneath the tongue is frequently the seat of cystic formations, which take their origin sometimes in the mucous follicles which abound in this situation, sometimes in the ducts of the sublingual and submaxillary glands, sometimes in the areolar spaces, and, possibly also, sometimes in the bursa between the genio-hyo-glossi muscles. To all these cysts, whatever may be their exact pathology, the term *ranula* is applied. The majority of them are unconnected with the salivary glands, and in many instances a probe may be passed along the ducts, or the saliva may be noticed flowing from them, while the ranula remains unaltered. Some belong to that simple variety which depends merely upon an accumulation of the normal secretion in a natural cavity, which has become temporarily obstructed. Such obstruction may arise from local inflammation, from inspissation of the normal fluid, or from the impaction of a salivary calculus.

Concretions, composed chiefly of phosphate of lime, are not very uncommon in the ducts of the parotid, submaxillary, and sublingual glands. These calculi may vary in size from a pin's head to a filbert, or even larger. Figure 30 represents such a calculus.



FIG. 30.—Salivary calculus.

For this specimen I am indebted to the kindness of my colleague, Mr. Canton. Not unfrequently these concretions form around some small foreign body, such as a grass-seed, or a morsel of wood, which has made its way into the duct. Occasionally they occupy the substance of the gland, but more often they are found in the duct. Here they may simply obstruct the outlet and give rise to an accumulation of the secretion, forming a ranula, and inconveniencing the patient by forcing the tongue upward and backward; or they may cause a local inflammation, which terminates in an abscess.

The treatment of these sublingual cysts is simple and satisfactory. If a concretion can be felt either with the finger, or with a probe passed along the duct, an incision should be made, and the calculus removed with a forceps. If it is very small, it may elude the grasp of the instrument; but in such a case it is sure to be washed out by the flow of saliva in the act of mastication. If there is a local inflammation, it should be fomented or poulticed; and if an abscess forms, it should be opened, and then treated in the same way.

The majority of cysts in the hypo-glossial space are superficial, lying in or just beneath the mucous membrane. They are, moreover, always small at their commencement;

so that, if the attention of the surgeon is called to them early, they can generally be cured by raising a piece of the cyst-wall with a forceps, and cutting it off with scissors. If this procedure does not seem advisable on account of the vascularity of the cyst, or for any other reason, a seton, composed of two or three threads of silk, may be passed through the tumour and knotted; and thus the contents will gradually escape, and the cyst contract.

In the larger tumours to which the term *ranula* is sometimes applied—those which lie between the tongue and the jaw, and which become prominent at the upper part of the neck—the cure is more difficult and tedious. Though the term *ranula* is applied to them, they are of a totally different kind from the tumours of which I have just spoken, and to which that name ought to be confined. They are in fact analogous to the sebaceous tumours which are so frequently met with in the skin, and, like them, contain a thick, gritty, putty-like substance of a fawn colour, often very offensive. This material is made up chiefly of the scales of epithelium, of plates of cholesterine, and of oil. The accompanying figure (31) was taken from a typical example of a sebaceous cyst, and may serve to illustrate the contents of the class of tumours of which we are now speaking.

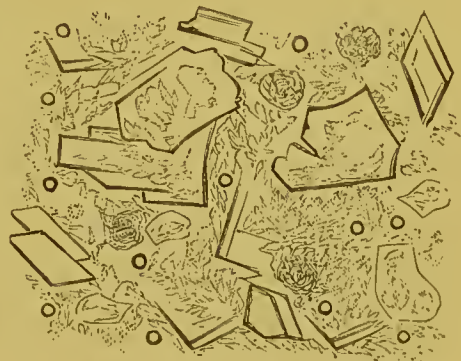


FIG. 31.—Contents of sebaceous cyst.

The best plan of treating these cysts is to open them freely from the mouth, scoop out the contents, in-

introduce a strip of lint into the cavity, and allow it to granulate and contract from the bottom. Sometimes it is desirable to make a counter-opening in the neck, and to treat the disease as an ordinary abscess. Passing a seton through it may occasionally be found useful. To dissect the cyst out is an unnecessary proceeding, and one which is not altogether free from danger. Whatever treatment is adopted, there will be some degree of inflammation, with swelling and œdema, embarrassing both respiration and deglutition. This must be overcome by fomentations or poultices to the neck, and such general measures must be used as are calculated to allay the febrile symptoms. An instructive case of this kind has been detailed by Mr. Hulke in the "Medical Times," for December 13th, 1863.

I pass on now to consider the much rarer class of cysts that are met with in the tongue itself. Such cysts are formed either by the occlusion and distension of one of the mucous crypts, or by the dilatation of one of the areolar spaces in the connective tissue.

Cysts of this kind are sometimes superficial, sometimes deep-seated. When they are superficial the diagnosis is easy, for the sense of fluctuation, which they convey to the point of the finger, is unmistakeable. But when they are deeply placed among the muscular fibres there may be difficulty in detecting their exact nature, more particularly if they have existed for some length of time, and if their walls have become thickened and condensed. Where a doubt exists, it may usually be set at rest by introducing a grooved needle, or by making a puncture with a grooved knife, such as I have had made for myself,

(Fig. 32). If cyst-fluid flows along the groove, the puncture may, as the knife is withdrawn, be converted into an incision. If pus escapes, and the supposed cyst is found to be a chronic abscess—with which cysts are not unlikely to be confounded—it may be evacuated in a similar way, and the disease treated in the ordinary manner.

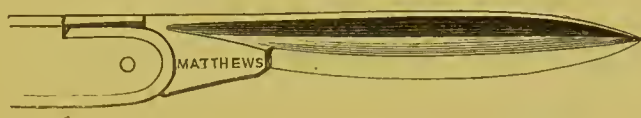


FIG. 32.

When there is no doubt about the diagnosis, if the cyst is small, it will suffice merely to lance it; or to lance it, and stir the interior with the end of a probe—as in dealing with a tarsal cyst—so as to set up a certain amount of inflammation, and thus lead to obliteration. If it is larger, it should be incised, and the interior touched with nitrate of silver, either in the solid form or in solution, or it may be filled with lint, and allowed to granulate.

Dr. Fayrer of Calcutta has recorded a case of cirroid aneurism of the sublingual branch of the lingual artery, which he believes to be unique. A native, aged forty, had a swelling under his tongue on the right side, about the size of a small orange. It had a tortuous, lobulated configuration, and pulsated strongly. It had been growing gradually for eight years, and was subject to violent hæmorrhages. It was of a livid colour at the anterior part, elsewhere it was very like an ordinary ranula. On puncturing it with a grooved needle, a jet of arterial blood escaped. Pressure was applied for a moment, and then a strong solution of tannic acid was injected with a subcutaneous syringe.

The pulsation ceased immediately, and consolidation of the tumour took place. The patient shortly afterwards left the hospital, but as long as he remained under observation the case was proceeding satisfactorily. ("Clinical Surgery in India," p. 485.)

I have seen a case which in some respects simulated a ranula, and might have been mistaken for one, but which, in fact, consisted of a chronic enlargement of the sublingual gland on both sides. The fold of mucosa, which passes from the tongue to the floor of the mouth, was distended and thickened, until it formed a tumour of a horseshoe shape round the base of the free portion of the organ. Though the situation was that of a ranula, it was evident from the appearance, as well as from the granular and racemose feeling which it conveyed to the finger, that it was not a cyst, but a solid, glandular tumour. In this instance the morbid state was due to the irritation of a carious tooth; but in various diseases, attended by irritation, I have seen this fold distended so as to become a serious inconvenience to the patient.

With regard to the treatment of this condition, the surgeon's attention must be directed to the disease upon which it depends. If it is due to decayed teeth the patient must be advised accordingly. If it arises in the course of an inflammation, or ulceration, it must be allayed by curing the primary complaint, and by putting a stop to the irritation of which it is merely a symptom.

CHAPTER XI.

ACCIDENTS AND INJURIES TO THE TONGUE.

BEFORE I conclude this treatise I ought to allude briefly to the accidents and injuries to which the tongue is liable, and which sometimes form the starting-points of disease.

The tongue is frequently bitten by patients who are suffering from epileptic or other fits. In fact this is one of the recognised phenomena of such attacks. The lesion in these cases may be more or less considerable. Sometimes there is only a trifling abrasion of the surface, and a slight escape of blood; at other times there are deep wounds, with copious hæmorrhage, and the frothy saliva about the angles of the mouth is stained with blood. In a mild case, when the patient has recovered from the immediate attack, nothing is needed beyond an astringent or emollient wash; *e.g.*, a little tincture of myrrh and borax. If, however, the wound is deep, it may be necessary to prescribe a styptic lotion, to order the patient to suck small pieces of ice, or even to unite the edges with fine silken or catgut sutures. The advantage of the latter kind of suture, is that it has sufficient cohesion to retain its hold for some days, until the wound has closed, after which it gradually liquefies, and comes away without any further interference.

In the Museum of the College of Surgeons is a preparation (No. 1064) taken from an epileptic idiot boy, aged six-

teen, who bit off the end of his tongue in a severe fit. Profuse hæmorrhage ensued, and continued for two days, for it was impossible to open his mouth to apply any styptic. After this there was a fœtid discharge, sloughs separated, he grew gradually weaker, and died in a state of insensibility.

Dr. Wickham Legg (*"Hæmophilia,"* pp. 58, 78) quotes two cases in which a bite of the tongue proved fatal in children of the hæmorrhagic diathesis.

It is very seldom, however, that such results follow. These self-inflicted wounds rarely penetrate so deeply as to require any treatment beyond the simple measures that I have mentioned. A notable example of the injury which a patient may do to himself without serious consequences is afforded by Dr. Althaus' case, to which I have already referred. Here the functions of the fifth pair of nerves were entirely destroyed, and the man, having no sensation in his tongue, made fearful gashes by closing his jaws upon it.

Accidents, however, frequently happen in which the tongue is still more severely lacerated.

Mr. Norgate of Norwich relates the case of a young man, aged twenty, who had his face crushed by a waggon-wheel. He sustained a compound fracture of the lower jaw, and his tongue was nearly severed at its base by the sharp edge of bone. When brought to the hospital it was found to be attached by only a few shreds of membrane. It was, therefore, removed. There was free, but not troublesome, hæmorrhage. Articulation was impossible for a time, and deglutition was difficult. However, the patient gradually recovered, and when he left the hospital speech was so far restored that he could be understood without trouble.

(“*Med. Times*,” Feb. 21, 1857.) Ambrose Paré mentions the following case:—“A child, three years old, fell with his chin upon a stone, and so cut off a large piece of the end of his tongue, which chanced to be between his teeth. It hung,” he says, “but at a very small fibre of flesh, so that I had very little or no hope to agglutinate and unite it, which thing almost made me pluck it quite away. Yet I changed that determination by considering the loss of the noble action of speaking, which would thereupon ensue. I also thought thus with myself;—the flesh of the tongue is soft, loose, fungous, and spongy, neither is it altogether obvious to the external injuries of the air. Wherefore after that I had once or twice thrust through the needle and thread upwards and downwards, and for the rest ordered the child to be used and dieted after the manner I lately mentioned; he grew well within a short time and yet remains so, speaking well and distinctly.” (“*Workes*,” Lib. x. ch. 27.)

Every surgeon must have seen cases more or less like this one so quaintly narrated by Paré’s translator. I have myself known a little girl nearly bite off the tip of her tongue, to the extent of half an inch, by falling with her chin on the edge of a couch. In a case such as this, if the patient is brought to the surgeon at once, his best course is to draw the edges of the wound together by a fine suture. The needle—a curved or spiral one—ought to be passed deeply through the muscular substance, and sometimes it may be necessary to introduce sutures on the under surface as well as on the upper. In order to do this satisfactorily the surgeon will require to place the patient in such a position that his head may be held firm; and he ought also to have

the help of an assistant to hold the tongue, and prevent the involuntary movements which it is apt to make, particularly when it has become fatigued by being long retained in a constrained position. However much the tongue may be mutilated, however nearly it may be severed from its connections, the surgeon should never despair of being able to save it. By using plenty of sutures, and, if need be, by preventing it from falling backwards by attaching it to the teeth with silver wire, the chances are that a very useful organ will be preserved. It is so richly endowed with nerves, so vascular, and placed in the midst of parts which are so highly supplied with blood, that the natural tendency to union is very great. There is probably no part of the body which repairs itself with more facility. Mr. Gant mentions a case which came under his care, where the tongue was severed by an incised wound extending nearly through the substance of the organ, and dividing the gustatory and hypo-glossal nerves on both sides. The detached portion, which hung by a mere shred on the left side, was replaced promptly, and secured in even contact with the root. Complete union took place, and the tongue slowly recovered the power of motion, and the sense of taste.

If some days have elapsed since the accident, a different mode of procedure will be necessary. The sides of the wound will by that time have become glazed, and a partial cicatrix will have formed, so that immediate union, or primary adhesion, is out of the question. It will be needful, therefore, to scrape the edges, or even to pare off a thin slice, and then to bring the sides together by sutures passed deeply through the muscular substance. If the

wound is only slight, it may suffice to touch the edges with a pencil of lunar caustic, and thus to produce raw surfaces.

Accidents such as those I have mentioned are generally attended with considerable hæmorrhage. Sometimes continuous pressure must be made with the tip of the finger in order to arrest this ; or with a small pad of lint dipped in the tincture of steel or of matico ; or it may even be necessary for the surgeon to use the actual cautery, or to tie the bleeding vessels. In some instances they can be taken up with a forceps, and ligatured in the ordinary way with a fine silk or hempen thread. If, however, this cannot be done, if the divided end of the artery has retracted so much that it cannot be seized, a tenaculum should be passed deeply through the tissues, including the bleeding point, and a noose cast over the convexity of the instrument. Sometimes a ligature may be passed through the tongue, beyond the bleeding point, and the threads tied at the side, so as to embrace one lateral half of the organ. Care should be taken while drawing the knot sufficiently tight to compress the tissues, and stop the hæmorrhage, not to run any risk of a slough. A ligature of this kind may be removed after a few hours, when the vessels will have become occluded. Sometimes æcupressure, in one of its various forms, may be resorted to with advantage. But, in some cases, more particularly if the patient is very young, or much alarmed, or deficient in self-control, it will tax the ingenuity and skill of the surgeon to find means of arresting the flow.

In some exceptional cases it may be thought necessary to tie the lingual artery ; and occasionally the external, or

the common carotid has been ligatured on account of persistent bleeding from the tongue. But such operations can only be rarely called for; and, indeed, the experience of the past is not encouraging with respect to them. Surgeons are not now so much afraid of hæmorrhage from the tongue as once they were. They have more means at their command for stopping it at the bleeding spot, and are less ready to make a fresh wound, and undertake a formidable operation for its arrest. Such a thing as death by hæmorrhage from the tongue is almost unknown, and when it has taken place it has been either by constant oozing in persons of the hæmorrhagic diathesis, or by ulceration laying open some large vessel. In the former case it is needless to say that no surgeon would make a second incision, and in the latter it is seldom that there is time to do anything. Experience, therefore, shows that local measures are almost always sufficient to stop the flow of blood, and that with tact and patience it will very seldom be needful to take any other steps.

If the surgeon deems it necessary to put a ligature upon the lingual artery, the vessel may be reached near its origin, where it lies just above the greater cornu of the hyoid bone, and before it passes beneath the hyoglossus muscle. These two points may be taken as the best guides to its situation; and here it is covered only by the skin, the platysma myoides, and the deep fascia of the neck. But when the depth at which the vessel is placed, the number of important parts which surround it, and the occasional irregularity of its origin, are borne in mind, it is clear that the operation should not be undertaken hastily;

and it may perhaps be thought preferable to put a ligature upon the external or the common carotid. But, as I have said, so far as the diseases of the tongue are concerned, it is seldom that the question of such an operation can come under discussion at all.

In military practice lacerations of the tongue are not unfrequently met with in connection with gunshot injuries of the face and head. It would, however, be foreign to my purpose to discuss this subject in detail. The damage done to the jaws, the base of the skull, or the brain, is usually so considerable that the lesion of the tongue is a matter of comparatively minor importance. If any projectile is lodged in the substance of the organ, and can be detected, it ought, of course, to be removed at once. But it occasionally happens that foreign bodies of this kind escape the attention of both the patient and the surgeon for an extraordinary length of time. A curious instance of this is related in the "*Lancet*" for January 17, 1846. A soldier was wounded in the cheek by a musket-ball. The crown of the second molar tooth was carried into the substance of the tongue, and there it remained for thirty-two years. It gave no trouble or inconvenience during that period, but at last an abscess formed, and it was discharged.

The most severe case of laceration of the tongue that I have seen occurred to a man who was a millwright by trade. When he applied to me he was fifty-eight years of age, and in tolerable general health. Eighteen years before I saw him he had fallen down a well upon which he was at work. In his fall he had broken his jaw, cut

his lower lip, and torn the whole of the anterior portion of his tongue. When he came under my notice there were deep scars across the middle of the organ, and in front of these the healthy structure of the mucosa was quite destroyed. Nothing remained but a cicatricial tissue. In some places it was red and raw-looking, in others purple and livid. Over its whole extent it was smooth and shining. In fact it had very much the appearance of a tongue that has long been affected with chronic superficial glossitis, such as is sometimes seen in the later stages of syphilis, and which I have fully described in an earlier chapter. But in this instance there was no syphilitic history, and there can be no doubt that the character exhibited by the mucous membrane was the result of cicatrization after severe laceration, and not of chronic inflammation, as in the syphilitic cases to which I have referred. This example shows that the papillary structure of the mucous membrane of the tongue is never reproduced, and it indicates how careful the surgeon ought to be to try and preserve it intact. This patient's sense of taste was blunted in the anterior part of the tongue, but the cicatricial membrane was exquisitely sensitive to the contact of hot, acid, or pungent substances, so that he was obliged altogether to avoid vinegar, mustard, and pepper in his food.

The tongue, like other parts, is liable to punctured, as well as to lacerated, wounds. Such accidents may easily happen in many ways; *e.g.* from the careless use of steel forks, from the foolish habit of holding pins or needles between the lips, or from a person re-

ceiving a blow when he has a pipe or a stick in his mouth. Dr. Gibb has recorded a case where the base of the tongue was transfixed with a needle, which the patient had swallowed with her food. The symptoms were very distressing, and great difficulty was experienced in deciding upon the exact locality of the needle, but, on examination with the laryngoscope, its point was seen protruding from the base of the tongue on the left side. The laryngeal mirror was held at the back of the mouth, the needle was seized with a fine curved forceps, and was extracted entire. The urgent symptoms immediately subsided. ("Lancet," June 30, 1866.)

In the same journal (August 26, 1837) the case of a punctured wound of a much more serious nature is related. A sailor, aged thirty, was keeping watch on deck alone, and at the same time smoking. It appears that he either fell, or struck himself, against some object by which the pipe in his mouth was driven into his tongue and broken. There was at first but little apparent injury, and only slight hæmorrhage; but subsequently the tongue began to swell, and on the fourth day he was taken to the London Hospital. His mouth was then closed, he could hardly breathe, and he had swallowed little or nothing since the accident. There was swelling at the upper and back part of the neck. The tongue was enormously enlarged, and fluctuating. An incision was made, and an ounce of purulent fluid, mixed with blood, escaped. This gave some relief, but the symptoms soon returned with greater intensity than before. A probe was then passed into the tongue, by the opening made with the lancet, and something

hard was felt in the deep substance of the organ. This was grasped with a forceps, and extracted. It proved to be a piece of pipe-stem four inches in length. Immediately after its removal there gushed from the mouth and nostrils a frightful torrent of blood, and the man was dead in little more than a minute. At the post mortem examination it was found that the pipe had entered the right side of the tongue near the tip, traversed it obliquely, emerged on the opposite side, near the root, passed just below the left tonsil, and completely transfixed the left carotid artery and internal jugular vein. The tobacco-pipe had acted as a plug to the wounds in these vessels, and, as soon as it was removed, the fatal hæmorrhage occurred.

However distressing to the surgeon such a result of his efforts must have been, there can be no doubt that the treatment adopted was correct; and that the general rule which requires us to remove as soon as possible any foreign body that may be present in a wound is a sound one. In a case where the injury is confined to the tongue itself there will seldom be much hæmorrhage, for the main vessels will yield and be pushed aside more often than divided. The fatal issue in the case just related depended upon the pipe-stem having passed beyond the tongue, and entered the large vessels of the neck. In an ordinary case, when the penetrating instrument has been extracted, the separated tissues will come together by their own elasticity, and little or no further inconvenience will be felt.

Another way in which the tongue may be injured is by the bites of venomous reptiles, or by the stings of insects.

In the "*Lancet*" for September 8, 1827, the story is told of a boy who caught a viper, and thinking it a harmless snake, allowed it to coil round his arm, and at length put its head into his mouth. Thereupon it bit him on the right side of the upper surface of the tongue. There was slight bleeding from the wound, and the organ immediately began to swell. At the same time there was great depression, the lad's countenance becoming pallid, his forehead bedewed with perspiration, and his pulse quick and irregular. There was no pain; the tongue felt benumbed. There was copious discharge of saliva tinged with blood. The injury was received about 5 P.M. The symptoms increased in severity, the tongue becoming more enlarged, and the difficulty of breathing and swallowing greater until about 10 P.M., when they began to subside. In three days the boy was quite well, only an ulcer remaining to mark the seat of injury. The treatment consisted of purgatives, with ammonia, and plenty of nutritious liquid food.

In the "*Lancet*" (April 11, 1840), the case is related of a man who met with a similar injury. Here the symptoms ran so high, and the dyspnœa became so urgent, that it was deemed necessary to perform tracheotomy. The patient recovered perfectly, and was well in three days.

If a person is stung, or bitten on the tongue by a wasp, bee, ant, or any other insect, as may happen in eating fruit, he should wash his mouth frequently with an alkaline lotion—a weak solution of ammonia, for example. This allays the irritation and inflammation, by neutralizing the formic acid which is the active principle of the poison.

Should the injury be severe, and the tongue become so much swollen as to cause great inconvenience, and even alarm, the case must be treated on the principles already laid down in speaking of acute glossitis.

Oceasionally the tongue is scalded, or the patient injures it by drinking some irritant or caustic solution. The effects of such an accident vary greatly in degree. They may be slight, and only produce a little superficial inflammation, which will be subdued by rest, by a saline purgative, by holding fragments of ice in the mouth, and by a plentiful supply of soothing demulcent drinks, such as barley water. If the case is more severe, as will almost invariably happen when strong acids or alkalis have been swallowed, the same treatment must be adopted, and in addition it is well to keep the air of the room warm and moist, by means of a jet of steam from a kettle kept constantly boiling. But it is not improbable that the difficulty of breathing may become great from inflammatory swelling about the glottis, and then tracheotomy will be necessary. Such a case, however, passes out of the category of simple injuries to the tongue, and becomes much more serious, on account of the lesion to the fauces and œsophagus. The effects of such an accident are well illustrated by a preparation in the Museum of the Royal College of Surgeons (No. 1083). It consists of the tongue, and adjacent parts, from a boy aged ten, who had swallowed sulphuric acid. The greater portion of the organ has lost its papillary structure, and is covered with a thin wrinkled and polished cicatrix.

A singular case has been related by Mr. Prescott Hewett in which the tongue became swollen, ecchymosed, and pro-

truded beyond the teeth, in consequence of surgical emphysema. The patient had fallen from a scaffold fifty feet high. He sustained very severe injuries to the head, but in addition to these there was urgent dyspnœa and emphysematous crackling about the root of the neck. The emphysema spread rapidly, and in a short time crackling was perceptible in the cellular tissue of the upper part of the body, and extended to the tongue. Gradually the lower extremities became affected, and the patient died on the third day after the accident. At the post mortem examination it was found that neither the ribs nor the lungs were injured, but that the right side of the cricoid cartilage was fractured in two places, and that a sharp angle had penetrated the mucous membrane, and produced an irregular opening the size of a pea, which communicated freely with the cellular tissue of the neck, and had given rise to the emphysema. ("Path. Soc. Trans.," i. 199.)

Occasionally the hyoid bone is broken. When this occurs there is pain, swelling and inflammation at the root of the tongue, with difficulty in moving it, or in using it in speaking or swallowing. This rare accident is generally the result of direct violence. One case, however, is on record in which it was caused by muscular action. A woman, fifty-six years of age, missed her footing and fell. Her head was thrown violently backwards, and at the same moment she felt a sensation as if a solid body had broken at the upper part of her neck on the left side. On examination it was found that she had fractured the left great cornu of the os hyoides. Inflammation and suppuration followed, and about three months afterwards the posterior fragment

made its way out in a state of necrosis. The opening soon healed, but for many years there remained a sense of uneasiness in the throat when she swallowed. (Malgaigne, "*Traité des Fractures*," p. 405.) This accident is not difficult to diagnose, because an unnatural mobility of some portion of the hyoid bone can be felt at the point which is described as the seat of the most acute pain. The treatment which it needs is also simple. The bone is embedded and balanced between antagonistic muscles, which, if kept at rest, form a kind of natural splint. The surgeon must, therefore, enjoin upon his patient to move his tongue as little as possible, to abstain entirely from talking, and to live upon a fluid diet. The maximum of repose being thus secured, all that remains to be done is to subdue the local inflammation by fomentations or cold lotions to the upper part of the neck, and to give such general directions for the patient's guidance as the peculiar circumstances of the case may indicate.

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